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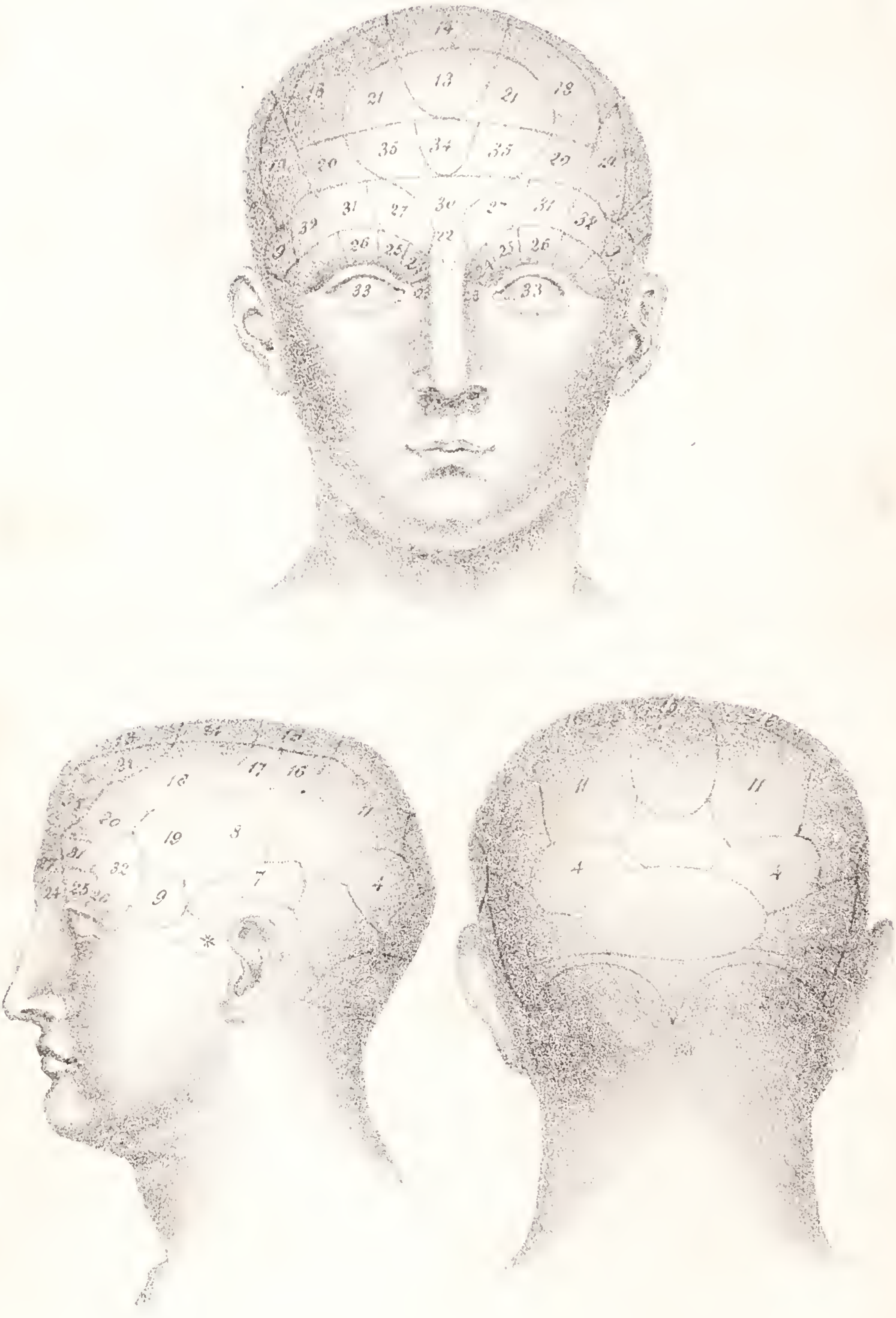

PHRENOLOGY,

OR

THE DOCTRINE OF THE MIND;

AND OF THE

RELATIONS BETWEEN ITS MANIFESTATIONS AND THE BODY.

BY

G. SPURZHEIM, M. D.

OF THE UNIVERSITIES OF VIENNA AND PARIS, AND LICENTIATE OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

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POWERS AND ORGANS OF THE MIND.

AFFECTIVE.

I.—Propensities.

No.
1. Amativeness.
2. Philoprogenitiveness.
3. Inhabitiveness.
4. Adhesiveness.
5. Combativeness.
6. Destructiveness.
7. Secretiveness.
8. Acquisitiveness.
9. Constructiveness.

II.—Sentiments.

10. Self-esteem.
11. Love of approbation.
12. Cautiousness.
13. Benevolence.
14. Veneration.
15. Firmness.
16. Conscientiousness.
17. Hope.
18. Marvellousness.
19. Ideality.
20. Mirthfulness or gayness.
21. Imitation.

INTELLECTUAL.

I.—Perceptive.

No.
22. Individuality.
23. Configuration.
24. Size.
25. Weight and resistance.
26. Colouring.
27. Locality.
28. Calculation.
39. Order.
30. Eventuality.
31. Time.
22. Melody.
33. Language.

II.—Reflective.

34. Comparison.
35. Causality.

Works published by the same Author in English.

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1. Philosophical Principles of Phrenology.
2. Outlines of Phrenology.
3. Elementary Principles of Education.
4. Observations on Insanity.
5. Examination of the Objections made in Great Britain against Phrenology.

PREFACE TO THE THIRD EDITION.

The book presented to the English public, under the title *The Physiognomical System*, contains several summary views of the different branches of anthropology, which can be appreciated only after having been examined with great attention in all their details. As this, however, is done by few, I have deemed it necessary to extend the principal chapters, and to publish them as separate works: in one I give an abstract of our anatomical researches; in another I treat of the principles of education; in another of the deranged functions of the mind, of insanity, &c.; whilst in this now laid before the public I have collected all that relates to the functions of the brain, or the *physiological* part of the physiognomical system. This arrangement, besides being in itself preferable to that followed in the first two editions of the physiognomical system, will have the further advantage of accommodating purchasers, as either part may be had separately.

I am aware that neither English philologists nor the English public like to admit new words, and I must apologise for having introduced several. Unwilling to dispute respecting words, I shall, nevertheless, be thankful for every observation which may improve our knowledge of human nature, or rectify the nomenclature of our philosophical ideas; but I shall pay no attention to any remark which may originate in individual motives, or which may seem to indicate any other intention than scientific investigation requires. Let us never forget *Nihil aliud natura, nihil aliud sapientia dicet.*

Having introduced new names I shall state my reasons for doing so. The English language presents very few single words which express my conceptions of the peculiar faculties of

the mind. Hence I had to choose betwixt speaking by circumlocution and adopting new names. Now I think with Locke, that we have still the same rights as our predecessors, and I therefore propose new single names, formed, as much as possible, in conformity with the spirit of the language. Having established different propensities as peculiar faculties of the mind, in order to designate propensity, I have taken the termination -IVE, which shows the quality of producing, and -NESS, which indicates the abstract state; IVENESS is therefore joined to different roots, the preference being always given to English words generally admitted; but when such were not to be found, to Latin participles, so commonly used in English to express meanings similar to those I was in search of, as destructiveness, productiveness, &c.

The termination -OUS indicates a SENTIMENT, as anxious, cautious, pious, conscientious, &c.; and I should have been very glad to have found similar adjectives for every primitive sentiment of the mind. When they occurred, I have added -NESS in order to express the abstract state, as cautiousness, conscientiousness, marvellousness.

The names of the INTELLECTUAL FACULTIES are easily understood, and do not require particular explanation.

If, under any head of this nomenclature, there be a better name than I employ, or one which indicates more exactly any determinate faculty, but no determinate action or effect of the faculty, I shall be glad to use it; for I am always disposed to acknowledge truth and every real improvement.

The reader will, I trust, excuse any Germanisms or Gallicisms which occur, and which may have escaped my friend Mr. R. Willis, of London, since it is by no means easy to give an idiomatic turn to the expressions of a foreigner. Nevertheless, I thankfully acknowledge his kindness in revising my manuscript, and in overseeing the correction of the press.

London, 3rd of May, 1825.

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PHRENOLOGY,

OR THE

DOCTRINE OF THE MENTAL FUNCTIONS.

INTRODUCTION.

THE name PHRENOLOGY is derived from two Greek words: φρην—mind, and λογος—discourse. I have chosen it to designate the doctrine of the special faculties of the mind, and of the relations between their manifestations and the body—particularly the brain. Man not being endowed with faculties proper to examine beings in themselves, I cannot speak of the nature of the mind; nor do I investigate how it acts, nor what its final destination may be. I merely observe its manifestations in this life, and the conditions under which they take place.

Many at the outset ask whether this doctrine be useful. It is, however, necessary to begin by knowing the nature, reality, and extent of phrenological principles before we can be qualified to speak of their application. I take it for granted that every

kind of knowledge is useful. I only add, that Phrenology concerns the most important element in the nature of man—the manifestations of his affective and intellectual faculties. Now we examine all the beings which surround us—we divide and subdivide the different objects which nature presents to us—we study mineralogy, botany, zoology; why should we not study man, who manifests the greatest number of faculties, and who is lord of the terrestrial creation? Man, considered merely as the most important being of creation, ought especially to interest every thinking person. Moreover, it must surely be of the utmost importance to know our own nature. Among the Greeks the divine precept written upon the temple of Delphos was Γνῶθι σεαυτὸν—Know thyself.

Phrenology, by specifying the fundamental powers of the mind, will become the basis of philosophy. Our interest, too, in being acquained with human nature, increases in proportion as we live in society, and as we feel the necessity of influencing those we would direct. Institutions that are not founded on the true knowledge of mankind cannot be permanent. Physicians also, who treat the insane, ought to be acquainted with the conditions requisite to the mental operations in the healthy state. Phrenology is, therefore, an indispensable part of a medical education. Thus it seems impossible to point out any object more interesting to natural philosophers, anatomists, physiologists, physicians, teachers, moralists, and legislators.

I do not pretend that the study of man has been neglected. On the contrary, reflecting people in all ages have thought it especially worthy of their attention. They have noticed the actions of the most remarkable individuals, as well as of mankind in general—enquired into the number and nature of the faculties of man—and invented many systems as developements of the causes of human actions. But, though individuals of almost all professions have endeavoured to elucidate human nature, it must be allowed that our knowledge of the subject is still extremely defective ; and, when we consider that so many great men have been engaged in its study, we are astonished that so little has been accomplished.

It would, indeed, be difficult to imagine this slow progress and limited improvement, if the manifold obstacles to scientific enquiries in general, and to anatomy and physiology in particular, were unknown. Among the former, we may reckon the religious respect which men have for ancient opinions, and their aversion to such as are new ;—the obligation and the ease of maintaining accredited opinions ;—our inaptness to think for ourselves ;—the want of clearness and precision in our ideas, and in the signs by which we express them ;—the mania for forming systems upon a few solitary facts and hasty conceptions ;—the jealousy, the envy, the falsifications of opponents ; and their malice in drawing dangerous consequences from the most innocent statements.

The particular causes of ignorance in mental philo-

sophy may be divided into natural and artificial. Among the natural, the most important is the difficulty which the examination of mankind presents. It may be observed in general that knowledge is less advanced the more difficult the object of examination is. It is easy to describe minerals, their volume, figure, weight, density, colour, and other physical qualities. This may also be done at leisure. Hence mineralogy is eminently advanced. Enquiries relating to botany and zoology are more difficult; and these sciences are consequently less forward. For the same reason we are, even as to plants and animals, better acquainted with their physical qualities than with their vital functions. Anatomy, being easier than physiology, is also more advanced. We may describe and make drawings of animals at leisure; we may anatomize and preserve them with ease; but it is more difficult to observe facts in their lives, to enquire into their instinctive labours, their propensities, and their particular faculties. Of the many books which treat on human nature, anatomical descriptions form the greatest portion. In anatomy the parts, in physiology the functions most easily examined, are also the best known. It is infinitely easier to examine muscles and bones than the nervous system; anatomical and physiological knowledge of the brain and nervous system has therefore made the slowest progress. Till our days, the external forms of the brain and its parts only were known; their internal structure was quite overlooked; and the physiological ideas on

the brain and nervous system have been but a succession of errors, ever conformable to the prevailing philosophical system of the day.

Besides the natural difficulty of enquiring into the causes of the functions, there are many artificial obstacles.—The metaphysical notions of the schools have impeded improvements in psychology greatly. By substituting such metaphysical opinions, on all occasions, for data which the observations of nature would have furnished, physiologists, and even anatomists, came to regard these opinions as sacred. The schoolmen, for example, say, the soul is simple, and therefore its material residence must be simple also, and all the nerves must end in a point; in other words, the nerves can have only one origin, because each inindividual has but one soul. Bonnet, Haller, and others, having extended its seat to the whole substance of the brain, were contradicted by the metaphysicians, who did not reflect, that a little more or less room could not enable them to explain the nature of the soul any better; nor that, according to the remark of Van Swieten, Tiedemann, and others, a material point, in which all ideas and sensations should centre, is inconceivable, in consequence of the confusion and disorder which would result from such an arrangement. It appears, indeed, ridiculous that the naturalist should be guided in his researches and inductions by such frivolous speculation. If metaphysicians, on the contrary, would observe facts and ascertain the conditions with which these are coupled—on which they depend,

their notions would never be at variance with the inferences of anatomy and physiology, and one science would not arrogate the right of setting bounds to the progress of another. The doctrine of a single origin and central point for all the nerves is neither true nor possible; as may be verified by examination. If, after this, the metaphysician cannot comprehend the unity of his individual consciousness, I ask him if he can understand how, in automatic life, such different apparatus concur by their varied functions in forming one whole—if he can reconcile, in animal life, the occurrence of double organs with unity of function and simplicity of consciousness—if he can comprehend any single power in the material world?

The principal artificial impediment to the improvement of psychology was the blamable method pursued in the study of human nature. All phenomena were explained by the imagination alone, or by hypotheses. There exist, even at the present day, philosophers who maintain that man is in no wise subjected to the laws of nature—that he can begin a series of actions independent of all cause and motive, and that his actions admit of no explanation. According to these schoolmen, man is separated from all other beings, and is considered as regulated by laws peculiar to himself. They attribute all his operations to his soul; several of them even give it unbounded power over the body. This negligence in not comparing man with other beings has been a great obstacle to the progress of psychology.—Moreover, the various

branches of anthropology, instead of being studied together, are cultivated separately. The useful example of the Greek philosophers is neglected, and anatomy, physiology, medicine, philosophy, education, religion, and legislation, instead of being studied as parts of a harmonious whole, and united so as to exert a mutual influence, are split into so many particular doctrines or sciences.

Man must be studied as a being of creation; and his nature requires the same method of examination as every other natural object—observation and induction. To what profession then does the study of human nature especially belong? Many persons cannot conceive why a physician should be continually speaking of the knowledge of human nature. No profession, however, is more interested in, and none affords better opportunities for, its examination. The particular province of the physician is, indeed, man in a state of disease; but it is evident that knowledge of the healthy must be the foundation of knowledge of the diseased state; that is, pathology must be based upon physiology. Derangement of the functions cannot be understood if we are not acquainted with their regular and proper actions. Hence all physiological enquiries are most intimately connected with medicine.

It cannot be doubted that, considered even in itself, the most important part of man is the nervous system; and traced in its relations with other parts and other systems, enquiries into its functions must also be more

important the greater the influence it exerts upon every operation of the animal economy. Now in man, and the more perfect animals, the manifestations of all the functions are more or less subordinate to, and under the influence of, the nervous system. Those of digestion, nutrition, circulation, respiration, secretion, and excretion, are deranged or annihilated, when the nerves which co-operate in their performance are compressed, wounded, or destroyed. Chemical changes, as acidity in the alimentary canal during digestion, are the more apt to happen, the less the nervous power is active. The nerves distributed to the organs of sense and to the muscles, are indispensable to the performance of their functions. Impressions made on the body below the division of a nerve are no longer perceived, and the principle of motion cannot now be directed towards the muscles with which it is naturally connected. We shall also see that, besides the functions of the five external senses, all the instincts, propensities, sentiments, and intellectual faculties, all affections and passions, and all the characteristics of humanity, are made manifest by means of the nervous system alone.—Hence we must acknowledge that, without a sound physiology of the nervous system, there can be neither psychology nor any species of philosophy; and that physicians, in determining the nervous functions, render the greatest service to philosophers, moralists, teachers, judges, and legislators.

From this it is obvious that physicians, who must

study the influence of the nervous system, are especially called upon to contribute to the advancement of the knowledge of man. The exercise of no profession indeed makes the necessity of knowing both his physical and his moral state so intimately felt as that of medicine, in consequence of the influence of affections of the mind upon the vital functions. Who has not observed that grief, jealousy, envy, hopeless love, and similar painful affections, consume the principle of life? The examination of the nervous system, and of its influence, further interests physicians especially, as all mental alienations have their primitive cause in the mediate or immediate derangement of a part or of the whole of it. In pointing out the conditions necessary to the manifestations of the sentiments and intellectual faculties in the healthy state, we consequently contribute also to elucidate mental diseases; no one, then, is more interested than the physician in discovering the nature of man.

Fortunately, no class of men is better prepared than physicians to investigate such subjects by accessory knowledge, and by the study of nature in general; nor is any one so frequently and so seriously admonished by nature to revise opinions, to forsake hypothetical reasoning, and to follow the simple method of experience, as he who is occupied in the treatment of disease. No philosopher has such ample opportunity of being intimately convinced that all our knowledge ought to be reduced to a rational mode of judging from experiment and observation. The phy-

sician, moreover, is placed in circumstances the most conducive to a profound and certain knowledge of man. No one has such facility of observing men at all times and in all situations, when liberated from, when incapable of, the restraint and ceremony which custom and convenience impose. He alone has an opportunity of being, during the night or the day, witness of the most intimate relations and the most secret events in families. Both the good and the bad, when sick, conceal their true sentiments with difficulty; and who does not desire the friendship and the confidence of the man whom he trusts with his own life, and with the lives of his wife and of his children? To him, supposed to know all that belongs to human nature, the most secret thoughts are exposed, frailties and errors acknowledged; his judgment is guided by unreserved trust reposed. There is, consequently, no profession more entitled to study mankind than the medical.

The functions of man are of three kinds: vegetative, affective, and intellectual. The vegetative are destined to preserve the individual, and to continue the species. The affective and intellectual are generally comprehended under the title Animal Life, and are the real object of Phrenology, and of this volume, which will be divided into nine sections. In the first I shall speak of sensibility in general; in the second, of the relations between the affective and intellectual manifestations of the mind and the bodily constitution, or the temperaments, and the viscera of

the abdomen and thorax; in the third, of the dependency of the affective and intellectual faculties on the brain; in the fourth, of the necessity of dividing the faculties of the mind, and of admitting the plurality of the respective organs; the fifth section will treat of the means of determining the functions of the cerebral parts; the sixth, of craniology; the seventh, of the division of the fundamental powers; the eighth, of the affective qualities and their organs; and the ninth, of the intellectual faculties and their organs.

PHRENOLOGY.

General View.

It is impossible, in the present state of our knowledge, to give an exact definition of man; his nature is not yet sufficiently known. Such as we find in books include the term *animal;* he who is not aware that man is an animal in many respects, or has many organic parts and numerous functions in common with animals, is little advanced in anthropology. On the other hand, whoever thinks that there is no essential difference between man and animals of a superior order is also far from having an accurate knowledge of human nature. There is no direct break in the chain of animated beings; and all are linked together by analogies. The idea of a regular scale and an uninterrupted concatenation of objects is obvious; all divisions into orders, genera, species, and families, established by human understanding, only mark the particularities, without interrupting the relations that exist among the beings of creation. The last plant and the first animal have a great number of like qualities; just as plants have something common among themselves, and animals with each other.

The difficulty we encounter in the classification of living beings generally, is also perceptible when we attempt a division of the functions of any one being. Man not only exhibits several functions analogous to those both of the inanimate and organised kingdom, but the whole of those he possesses are likewise connected so intimately that they cannot be considered separately. Even the characteristic qualities of humanity have something analogous with the powers possessed in common by man and animals.

All who have studied nature in general, or man in particular, have always paid the greatest attention to the causes of the phenomena they observed. They are divided into two classes: materialists and spiritualists. The former looked for an explanation of the phenomena, in various combinations of constituent elements, or in the mixture and form of bodies. The latter attributed all phenomena to beings, principles, entities, substances, spirits, or souls. According to them, planets and comets are moved, plants grow, and animals exhibit their functions by the influence of souls. All activity is a consequence of the agency of immaterial beings. Inertness and form are the essential characters of matter. There is a certain number of elementary matters; and these can exist either singly or in a compound state, but in every case without inherent activity.

The doctrines of the souls, or psychology, is involved in the most inextricable difficulties. Now-a-days matter is considered as active, or endowed with various qualities, and as exercising some influence in the universe. Salt is soluble in water; the quality of solubility is therefore inherent in salt, though this may be latent till brought into contact with water. Thus matter is not inert, in the sense that it has no qualities, but these may be dormant or inactive, and their exhibition may require the action and re-action of other substances.

The same remarks apply to organized, or those bodies which are composed of different matters, and arranged in such a manner as qualifies them to perform certain functions. They are endowed with dispositions, but these remain inert or inactive without an exciting cause. An egg, proper for incubation, and fruit-trees in the winter season, possess vitality, but they require the influence of caloric to show it. Thus organised beings, though composed of a variety of substances, require additional exciting substances, which, in ancient times, were styled immaterial and incorporeal, or spirits, as being without form.

The doctrine of immaterial substances is not sufficiently

amenable to the test of observation; it is founded on belief, and only supported by hypothesis. It is an essential item in metaphysics. Opinions upon such points must vary continually, and none can ever gain general assent. Those which flatter the wishes of man the most, and astonish and promise the greatest advantages, will be the most readily and generally believed.

Many ancient spiritualists admitted two souls, one irrational and mortal, another rational and immortal. Stahl and his school understand by the term soul a being that produces all the phenomena of man, as well the vital as the animal functions.

The majority of modern spiritualists define the soul a being which has consciousness and will, and which is immaterial and immortal.

Modern physiologists examine the vital functions of animals independently of the soul; they speak of certain fluids, called by the ancients spirits, as their causes, but do not agree about their number. Caloric evidently exists, and is essential to life. The influence of the electric fluid is also frequently obvious. Discussions, too, on the vital and on the nervous principles are not yet terminated.

The doctrine of active principles becomes particularly difficult when we come to consider the affective and intellectual functions of man. Religious people often reject all such investigations, and stick to faith. We, however, must be permitted to regret that the religious codes of neither Jews nor Christians decide on the number, or determine the nature, of the principles which act in man. They admit positively an immortal agent, but do not deny the existence of other principles. Is it true that the body has its own laws, and that the affective and intellectual faculties depend on two separate principles? may we therefore speak with St. Paul of "the body, the soul, and the spirit?"*

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* 1 Thess. v. 23.

Physiologists, following the opinions of metaphysical schools, soon thought of looking for corporeal seats or habitations of the principles or souls. Those who believed in one single soul, as cause of all the phenomena of man, assigned to it a more or less extensive seat; at one time the whole body, and again, no more than a single point. Aristotle placed the sentient soul in the heart, Erasistratus in the membranes, Herophilus in the great cavities of the brain, Serveto in the aqueduct of Sylvius, Aurantius in the fourth ventricle, Descartes in the pineal gland, Whaton and Schellhammer in the commencement of the spinal marrow, Drelincourt in the cerebellum, Bontekoe, Lancisi, and La Peyronnie in the corpus callosum, Willis in the corpora striata, Vieussens in the centrum ovale of the medullary substance, and so on.

Metaphysicians also endeavoured to explain the influence between the soul and body mutually; and they broached the most extravagant opinions upon this point. Some authors, with Malebranche, consider God as the immediate agent between the soul and the body:—others explain the mutual influence of the mind and body by the agency of some medium or middle substance; and hence the great number of vapours, fluids, pneumata, and vital spirits; hence the introduction of caloric and the electric, galvanic, and magnetic fluids.

Enquiries into the nature of the soul, its origin, seat, mode of action on the body, and final destination, belong exclusively to metaphysicians and theologians; they are beyond the province of the physiologist. Both Dr. Gall and I, therefore, have always declared that we merely observe the affective and intellectual manifestations, and the organic conditions under which they take place; and that, in using the word organs, we mean only the organic parts by means of which the faculties of the mind become apparent, but not that these constitute the mind.

SECTION I.

On Sensibility.

This expression has not always the same meaning. It is often confounded with irritability. Sensibility, then, indicates the power of acting in a regular way, according to previous impressions. It is in this sense that we speak of sensible or sensitive plants; and that the sensibility of animals is divided into two sorts: one organic, and another animal; the first, or organic, taking place without, and the second, or animal, existing with consciousness. Descartes, Stahl, Cabanis, Bichat, Cuvier, Blumenbach, Reil, and others, admit sensibility without consciousness. I limit the sense of the word, and employ it only to indicate the power of perceiving and of knowing impressions made on the nerves.

As I make a distinction between irritability and sensibility, so I also separate consciousness and sensibility from *voluntary* functions. Sensibility is frequently opposed to the involuntary or automatic functions; but in that sense, by far the greater number of the affective and intellectual functions are automatic.

Now the Seat of Sensibility may be demanded. The greater number of physiologists consider the brain, without the spinal marrow and nerves of the five external senses, as the organ of all consciousness, and in support of this opinion, adduce the following proofs. A nerve that is divided cannot produce either sensation or voluntary motion, however irritated. Hence, the sentient principle does not reside in the nerves, nor at the place where the impression is made, but in the brain. If a nerve at its origin or in its course be compressed or tied, its function is suspended, but if the pressure be removed, it returns. Hence,

the consciousness of all impressions must reside in the brain. When the brain is compressed by a fluid, by an excrescence, by turgid blood vessels, or suffers a violent concussion, all sensation is interrupted, and is only restored as the compression goes on diminishing or is entirely removed. In convulsive fits pains are sometimes felt as if ascending along the nerves to the brain. These pains are often cured by dividing or by tying the nerves. After the amputation of a limb, individuals, though perfectly cured, often fancy that they feel pain in the fingers, toes, or other parts of the amputated limb. This pain can only have its seat in the brain. Finally, volition comes from the brain; consequently, the first cause of voluntary motion resides in it. The opinion that all consciousness resides in the brain was formerly supported by the assertion that the nerves are continuations of its substance, and that they have a central point of union in it. This argument, however, can no longer be received, as Dr. Gall and I have demonstrated that neither the nerves of the external senses, nor the spinal marrow, are prolongations of the cerebral mass, and also that no such central point exists, but that every pair of nerves has its own origin, and that the different systems are brought into communication by nervous bundles, and through this medium exert a mutual influence.

OBJECTIONS.

On the other hand, arguments of different degrees of validity may be employed to prove that the brain is not exclusively the organ of sensation and of voluntary motion. Dumas thinks that those who having lost a limb imagine they feel a pain in it, do so by their power of recollection. If that be the case, Dumas ought to prove that the power of recollection is different from that of consciousness, before he can conclude that that power may exist in the brain and consciousness every where. Besides, why is it absolutely impossible to produce equal degrees

of other agreeable or disagreeable sensations by means of the power of recollection? Moreover, after amputations, why are pains particularly excited by wet, stormy, and changeable weather? The assertion of Dumas is therefore far from refuting the positive proofs, that all consciousness belongs to the brain.

The same physiologist thinks that the brain can neither be the seat nor the organ of sensation, because it is insensible. It is true that the convolutions of the brain, when wounded or mutilated, do not produce such pains as the nerves of feeling when they are injured. Yet in certain diseases the brain becomes very painful, just as happens with other parts which manifest little or no sensibility in the healthy state. Besides, no one says that pains felt in his limbs exist in the brain. They exist in the part where the impressions are made; and consciousness alone exists in the brain. Moreover, we must remember that the sensations of different parts are quite dissimilar, and that although one part does not produce the sensations of another, it cannot on that account be called insensible. The nerves of hunger and thirst cannot perceive the sensation of pride or of compassion; the olfactory nerve cannot perceive the impressions of light, *&c.*, but every particular sensation appertains to a particular organic structure. Now thinking and willing are certainly sensations, and no one can or will deny that these two functions are confined to the brain: it can only be said, therefore, that the brain does not manifest all sorts of sensation. The assertion however that all consciousness resides in the brain, is not yet refuted, and it may still be maintained that the nerves produce the impressions, whilst the brain is necessary to perceive or have consciousness of them.

It is also objected that acephali, entirely destitute of brain, sometimes live, suck, and move in various ways; and consequently that the brain cannot be the only organ of sensation. In this objection automatic motions are evidently confounded with consciousness, in the same way as Gautier says

that a beheaded cock fluttering in the agonies of death struggles to fight and defend itself. All similar phenomena, which may be observed in insects, fishes, reptiles, birds, quadrupeds, and even in man, are the result of irritability without consciousness. Such motions only seem to be accompanied with sensation and will, because the organic structure and mechanical arrangement of the parts, cause the motions to be produced precisely as they would, were they determined by the will, and took place with consciousness. There are many phenomena which happen according to determinate laws without consciousness, reflection, or will; and muscular motions may be the same, whether they occur as effects of the will, or of any other irritating cause. During sleep and before birth, automatic motions exist in sufficient perfection, while the animal functions are still inactive.

It is not even determined whether the crying and sucking of the infant are always accompanied by consciousness, or whether these phenomena belong to automatic life. It seems to me that they are sometimes automatic and at other times animal, just as motions in general are. It must therefore be allowed that certain parts of the body produce automatic motions only; and that other parts subject to the will, are capable of producing motions, which are not the result of its activity, but conformable to their structure.

Duverney is said to have removed the brain entirely from some pigeons, which, notwithstanding, continued to exhibit all the animal functions. Similar experiments on turtles are mentioned by several authors, whose knowledge of the facts, however, has been derived merely from hearsay. We are quite sure that the whole brain cannot be removed without destroying at once the nerves of the external senses and the animals themselves. It is even generally known that sportsmen kill wounded birds by pushing a feather into their neck. In order to ascertain the extent to which these reported experiments of Duverney were true, I myself cut off the greatest portion of

the hemispheres of the brain of fowls and pigeons, even the great commissure, to the level of the lateral ventricles; and the animals manifested distinctly their senses of seeing and hearing. They did not take the food presented to them, but they swallowed bread and seed put into their bills. Rabbits mutilated in the same manner, walked, saw, and heard; they even took food spontaneously. It is evident therefore, that the removal of all the superior parts of the brain neither destroys the functions of the five senses, nor the muscular motions. But it is impossible to take away the whole cerebral mass without killing the animals. Hence, Dr. Gall and I declare, that the experiments made by Duverney must be entirely false; and we have shown, that all that can be concluded from similar ones is, that the whole brain is not necessary to the functions of the five senses; but still the conclusion by no means follows, that no cerebral part is absolutely necessary to their functions; seeing that, in animals of a higher order, it is impossible to separate the brain from the nerves without depriving them of sense and life at once.

There are other arguments which give us reason to suppose that the external senses have perception. There are animals to which it is impossible to refuse feeling and taste, although they present nothing which may be compared to the brain. Now, every nerve destined to a particular function has its own origin, its gradual enlargement, its particular form, and is a whole in respect to its structure; why relatively to its function should it not also be a whole? The functions of the nervous systems of the five senses are in proportion to the perfection of their particular organizations, and by no means to the quantity of brain. Several insects, notwithstanding the extreme smallness of their brain, are endowed with an extraordinary fine feeling, taste, and smell. Eagles, though possessing much less brain, see farther than dogs; and the smell of the canine tribes generally is more acute than that of man, whose brain is so much more considerable.

It has likewise been observed, that when the internal organization of a sense, as well as its external apparatus, is destroyed, all ideas belonging to it are lost or annihilated. It must however be granted, that even these arguments do not suffice to explain, why, among perfect animals, the nerves which are pressed, tied, or divided, lose sensation. Perhaps, in them, the inferior parts of the brain are as necessary to consciousness, as the heart is to the circulation of the blood; while in lower tribes a kind of obscure consciousness may exist independent of the brain, just as among them, and also among plants, circulation goes on without a heart.

After all, it remains undecided, at least as far as animals of the superior orders are concerned, how far the brain is necessary to the passive consciousness of the external senses. But it is certain that the will, and consequently the *voluntary* motions and reflection depend on the brain; for none of these phenomena are displayed without it. The regular motions are therefore to be distinguished into such as are regular but only automatic, and into such as are both regular and voluntary; the latter depend on the action of the brain, the former take place without it. It is also necessary to make distinctions respecting the functions of the five external senses: we are ignorant whether their passive consciousness exists with the presence of their respective nerves alone, or in consequence of the addition of the brain; this however is certain, that their active consciousness, accompanied with attention, reflection, and will, can only co-exist with the brain.

SECTION II.

Do the Manifestations of the Mind depend on the Organic Constitution of the whole Body, or do the feelings more especially reside in the Viscera?

Many physiologists and philosophers dwell particularly on unity, both in inorganic and organic nature. They maintain that the whole contributes to the performance of every function, and that no part can do aught in an isolated state. This manner of speaking is not sufficiently precise. It is indeed true that no part can perform its function if its organization be not healthy: the eyes must be perfect, otherwise they cannot see, *&c.* All the parts, therefore, which are concerned in the reproduction and nutrition of the organs, contribute mediately to the display of every function; peculiar functions, however, are performed by peculiar organs.

The greater number of modern philosophers and physiologists conceive the possibility of reducing the whole of the mental phenomena to understanding or intelligence. The ancients thought differently; they spoke of two sorts of operations, under the titles of soul and spirit, moral and intellectual faculties, heart and head, feelings and thoughts, *&c.* This nomenclature, however defective, proves that the phrenomatic functions were early divided into two classes. Different parts of the body were even assigned as their seats; the feelings being supposed resident in the viscera of the thorax and abdomen, and the intellect in the head.

To confound the feelings with understanding is a very grievous error which must retard the knowledge of man; it seems to have arisen from the simultaneous action of the affective and intellectual faculties. This, however, also happens

with the two sorts of the vegetative functions: those which preserve the individual go on whilst the species is propagated; yet these two cannot be confounded.

All philosophers have agreed to separate intellect from the vegetative functions; the reasons for doing so also prove the difference between the affective and intellectual faculties. I assume every one as conscious of his existence, of his intellect, and of his feelings. Personal conviction, therefore, is the same, both as regards the feelings and intellect. But how can we know that others are endowed with the affective powers? In the same way as we know that they possess intellect: by observation and induction in the healthy and diseased state. I think it superfluous to give more details on these points, or to enter very deeply into speculative reasonings, since the purport of this volume is to show the organs of the feelings as well as of the intellect.

CHAPTER I.

On Temperaments.

The ancient philosophers, in recognising the influence of the body over the manifestations of the mind, dwelt much on the importance of the temperaments. This expression has not always had the same meaning. Those who regarded mixtures of elements and bodily constitution as primary or secondary causes of the mental operations, employed the term temperament, sometimes to indicate the bodily constitution, and sometimes to designate the mental functions.

There is no doubt that the individual corporeal systems, such as the circulatory, secretory, nervous, and others, in-

fluence the whole body, modify its functions, and endow them with greater or less activity. But they are mistaken who imagine that the general organic constitution is the cause of particular feelings and intellectual faculties; for instance, that individuals of a sanguine temperament have an easy conception, a lively imagination, and a strong memory, and are addicted to sensual pleasures and levity; or who fancy that the bilious temperament is the cause of penetration, firmness, obstinacy, of concealment, ambition, of violent passions, *&c.*

This error is very easily refuted: First, all animals are neglected in the doctrine of temperaments. How can their widely varied and dissimilar faculties be explained by the small number of temperaments or their combinations? Idiots, too, have certainly some temperament; why do they not exert the faculties said to pertain to it? Moreover, daily experience shows that there is no fixed and constant proportion between temperaments and determinate mental faculties. There are many who, with a melancholy look, are not at all melancholy; we find sanguine and bilious people, intellectual or stupid, meek or impetuous; whilst phlegmatics are often bold, quarrelsome, and imperious; in many diseases also, the humours and organic constitution of the body are much altered, but the faculties of the mind do not suffer a proportionate change. In short, the doctrine of the temperaments as applied to the indication of determinate faculties is not more sure, nor better founded, than divination by the hands, feet, skin, hair, or ears.

We however deny not the influence of the organic constitution upon the manifestation of the feelings and intellectual faculties. We readily conceive how different organic constitutions may produce different degrees of activity of the faculties generally; but it is impossible to show that the same temperament should bestow great energy on some faculties, and strong peculiar passions, while the manifestations of others remain very weak. Thus, to derive determinate faculties and positive propensities from the temperaments, is very different from say-

ing that the faculties of the mind are modified by bodily constitution in general, and by that of the respective organs in particular. There are some individuals more irritable, more energetic, and more fit to be exercised than others; but the organic constitution of the whole body is not the condition on which the manifestations of the special feelings and intellectual faculties depend.

CHAPTER II.

Do the Feelings depend on the Viscera of the Abdomen and Thorax?

A GREAT number of physiologists, physicians, and philosophers, derive the propensities and sentiments from different viscera of the chest and belly, or from the nervous plexuses and ganglions of the great sympathetic nerve. Comparative anatomy and physiology suffice to confute this opinion. There are animals endowed with faculties attributed to certain viscera, which, however, do not possess these viscera. Insects, for instance, become angry, and have neither liver nor bile. The ox, horse, hog, *&c.*, have a great number of viscera analogous to those of the human kind, and yet want many of the faculties possessed by man, and attributed to these viscera. There is no proportion either in animals or in man between the size of the viscera or of the ganglia of the nervous system, and the strength of the moral sentiments ascribed to them. Several viscera, nervous plexuses, and ganglions, are likewise larger in animals than in man, and yet the attributed qualities are more energetic in man. There is no proportion between

the number of viscera and the nature of the propensities and sentiments in different animals. The four-footed beasts have viscera and nervous ganglia very much alike; as the dog, wild boar, ox, horse, sheep, beaver, hare, roe, wolf, tiger, lion, *&c.;* yet their inclinations are universally different, and even opposite. The heart of the tiger ought to be the organ of cruelty, that of the lamb of meekness; neither is there any proportion between the period of the developement of the viscera and the appearance of the propensities and sentiments. In young animals and in children several viscera are sooner developed than the inclinations ascribed to them are manifested; at least, they are not exhibited in the ratio of the developement. It is, therefore, astonishing that Bichat should have derived all passions from organic life, as he believed that organic life was perfect in new-born children, and yet that children have no passions. Those who, with Reil, maintain that the nervous plexuses and ganglia are the organs of the affections and passions, and who say that these apparatus are destined to weaken or interrupt the propagation of internal impressions to the brain, are guilty of a similar inconsistency; for affections and passions make powerful impressions which reach the brain, and are felt both by animals and man. Moreover, it is a principle in the animal economy, that every organic part manifests only *one particular* function. Now each viscus has its appropriate office, which is even generally known, and seen to harmonize with its structure.

Confining our view to the human species, we may add, that acephali and complete idiots have viscera and ganglia, and often a very energetic assimilating power, and yet manifest no moral sentiment. Finally, the moral sentiments are not deranged in proportion as the viscera are diseased. From all these considerations, we infer that the viscera do not produce the moral sentiments.

Some reply that man, when affected in any way, when influenced by passion, as anger, jealousy, or fear, feels evidently

some motion in the viscera, and that it is therefore natural to suppose these affections resident in the bowels. It may, however, be answered generally, that from sensations experienced, or other phenomena exhibited by different parts of the body, it is impossible to infer that the primitive causes are inherent there. Every part is in communication with, and exercises an influence upon, every other. In this way, the great sympathetic or nerve of the abdomen and thorax, is connected with the spinal marrow, with the nerves of the external senses, and with the brain. Without this connection, animal life would be confined to the brain, and this organ could not excite the instruments of motion. The activity of one part commonly produces different phenomena in others; and as the existence of pain and pleasure does not demonstrate consciousness of these impressions resident at the place where they are felt, so peculiar sensations experienced in the thorax and abdomen do not demonstrate that the affections have their seat in the included viscera of these cavities. Sorrow makes the tears flow, anger makes the knees tremble and the lips quiver; but who asserts that sorrow resides in the lachrymal gland, or anger in the knees and lips? Wounds of the brain excite vomiting: the primitive cause of this phenomenon is in the brain; but no one will place the vomiting there. Indigestible aliments occasion headache; and intestinal worms, narcotics, and other poisonous substances, sometimes produce madness, blindness, *&c.*; but who from this will maintain that headache, madness, blindness, *&c.*, have their seat in the alimentary canal? The remembrance of an injury received acts upon the heart, and increases the strength and frequency of its beats; but is the brain, therefore, the organ of circulation? From these and similar considerations, it follows that the sensations produced in different parts by affections and passions do not entitle us to infer that these are their respective organs.

All that has been said to prove that the abdominal and thoracic viscera are not the organs of the moral sentiments, ap-

plies also to the nervous plexuses and ganglia of the abdomen and thorax. These nervous systems are essentially necessary to the performance of the functions of vegetative life.

The influence, then, of the abdominal and thoracic viscera on the manifestations of the mind is only mediate; their functions contribute to the organic constitution of the brain as well as of the body in general, but they are not the seat of the affective faculties.

SECTION III.

The Brain is the Organ of the Affective and Intellectual Functions.

For many centuries the brain has been said to be the organ of the soul; and hence some may think it superfluous to enter into any detailed argument to support this truth. However, there still exist many doubts to be solved, many difficulties to be removed, and many notions to be fixed with more precision. The repetition of passing and contradictory opinions is very different from accurate knowledge of a subject in all its details.

If, according to the ancient philosophers, the intellectual faculties be placed in the brain, and the moral sentiments in the viscera of the abdomen and thorax, that the understanding might not be disturbed by the passions;—if it be said that the nervous plexus or ganglia are the seats of the affections;—if, according to Dumas, Richerand, Sprengel, and other physiologists, the difference of the feelings and intellectual faculties results from the difference of the temperaments;—if Pinel and others do not dare to seek in the brain for the proximate causes of mental alienations;—if Bichat consider the hemispheres of the brain as mere coverings of the internal parts;—if, according to Sabatier and Boyer, the brain be a secreting organ, and, according to all anatomists before us, the origin and source of the nerves;—if all sensations and ideas be derived from the five external senses;—if the instinctive labours of animals, and the arts of man, be ascribable to their hands, eyes, ears, and other external instruments;—if it be maintained that one nerve can perform the function of another, so that the nerves are homogeneous;—if it be taught by some magnetisers, that, in the perfect state of animal magnetism, the spirit acts without the assistance of the organization;—if the soul of the

world be spoken of and admitted;—if the greater number of metaphysicians maintain that the highest faculties of the understanding—reason and will, at least act independently of all organization;—if hydrocephalic persons be mentioned, who without brain have manifested moral sentiments and intellectual faculties;—if the same be related of animals whose brain was ossified;—if any of these assertions be admitted, and the brain be at the same time maintained the exclusive organ of the soul, the contradiction is evident. Now there is no author who has not advanced one or other of these suppositions; and therefore it will not be superfluous to detail our ideas relative to the organ of the soul, and to inculcate our principle that the brain is the sole organ both of the feelings and of the intellectual faculties.

In support of this truth, I accordingly make the following observations:—

Vegetative life requires neither the brain nor the cerebellum. The superior parts of both hemispheres, the great commissure, even more than half of the cerebellum may be wounded, destroyed by suppuration, or removed, without injury to the functions of the five external senses, or of vegetative life. Acephali, or monsters destitute of brain, are frequently born strong and fat, several of them even live some time after birth. Hence if the brain were not destined for superior functions, its existence would be useless. However, it is more than probable that the largest and most curious and complicated of all the nervous systems, has functions corresponding to the perfectness of its organization. Moreover all the parts of the body may be wounded or destroyed—even the nervous mass of the spine may be compressed or injured at a certain distance from the brain, without immediately destroying the feelings and intellectual faculties. In tetanus, produced by a cause remote from the brain, the other nervous systems are sometimes attacked in the most violent manner, while the functions of the mind remain entire till death. On the contrary, if the

brain be compressed or destroyed, its functions are deranged, and the manifestation of feelings and intellectual faculties is suspended or annihilated.

However defective our knowledge of the scale of the brain from the lowest animals to man may be, it is nevertheless certain that the number of feelings and intellectual faculties increases in proportion only as the cerebral parts multiply. Now this would not hold good were not the brain exclusively the organ of the feelings and intellectual faculties.

If the developement of brain be defective, on the other hand, manifestations of feelings and intellectual faculties are also defective. An infinite number of cases prove the brains of idiots from birth defective (Pl. ii., fig. 1.); and the manifestations of feelings and intellectual faculties perfect in proportion as the organization of the brain improves; and if its developement be very considerable, the feelings and intellectual faculties are very energetic. Of the truth of this last proposition every observer may be convinced by inspecting the heads of those who have excelled in talents, and have been remarkable for their general capacities. (Pl. ii., fig. 2.)

Again, manifestations of the mental faculties always follow the growth of the cerebral organs; in children the brain is small and pulpy, and therefore the functions of animal life are not manifested; but in proportion as it increases, the faculties appear; and in its state of highest developement the mental manifestations show the greatest energy. Moreover, in proportion as the organization of the brain decreases, the energy of the feelings and intellectual faculties decreases also.

Further, if the brain do not follow the common order of developement, if this take place earlier or later than usual, the feelings and intellectual faculties are evinced in the same order. Certain faculties, also, are more active in men, and others in women, in conformity with the difference observable in their cerebral organizations. Precisely as the volume and figure of

the brain are propagated from parents to children, are intellectual faculties and dispositions hereditary.

To the preceding proofs I may add, that the affective and intellectual faculties are weakened or deranged by age or disease in the same proportion as the brain is altered. This all concurs to prove that the brain is the organ of the feelings and intellectual faculties.

OBJECTIONS.

There are, however, various objections to the above conclusion. I shall answer the most important of these which are still repeated by authors.

I. *Diseases and Wounds of the Brain.*

To prove the brain the exclusive organ of mind, I have said that its functions are more or less disturbed by its diseases, and by wounds of its substance. Hildanus relates the case of a boy ten years of age, whose skull was by an accident depressed near the lambdoid suture, and, as no immediate ill effect ensued from this, the bone was not raised. The boy, however, who was endowed with strong mental dispositions, by degrees lost memory and judgment, became incapable of learning any thing, fell into decay, and died at forty years of age. Repeated observations induced Boerhaave to say, that if the bones of the skull be forced in so as to compress the brain, blunting of the senses, fainting fits, giddiness, loss of consciousness and delirium, will result. In the writings too of Morgagni, Haller, and others, many slight injuries of the brain are mentioned, by which the faculties of the mind were disturbed. It would be superfluous to cite a greater number of such examples. Several authors have even maintained that every injury of the brain necessarily produces some derangement of the functions of the mind.

On the other hand, much has been written and published which would persuade us that very considerable injuries of the brain have not impaired the manifestations of the soul. Thus, the case of one wounded in the head by a shot is recorded, in whose brain the ball remained, and who still lived for many years after the accident, without the least derangement of the intellectual faculties; after death the ball was found near the pineal gland*. A child of eight years of age had its skull broken by the kick of a horse, and pieces of the cineritious substance, larger than a hen's egg (as it is expressed,) were lost; this child, however, was restored to health, and his intellectual faculties did not suffer†. A youth fifteen years of age, received a blow on the head with a stone; his skull was fractured, his brain turned black and issued out at the wound; in a fit of delirium, he pulled away the apparatus which covered the wound, and with it a portion of brain, down to the corpus callosum. This patient was paralytic, but his intelligence was unimpaired‡. A child of seven years of age had a severe wound inflicted on his head by falling from a horse, and the brain issued continually by new excrescences, without doing any harm to the intellectual faculties. Another child lost a great deal of his brain by fungus, which continued to grow during four months. The cineritious substance, in the seat of the wound, was changed into pus; yet the child retained consciousness, and spoke intelligently till his death §. A stag drove its horn through the orbit into the head of a hunter, so that its point came out at the top of the head: notwithstanding this accident, the man walked to his home at a distance of two leagues. A great number of similar cases have been noted, partly as extraordinary occurrences, partly

* Memoires de l'Acad. de Chir. t. i. p. 134.

† Ibid. p. 126.

‡ Ibid. p. 150.

§ Van Swieten, t. i. p. 440.

as proofs of the brain not being the organ of the mind, and to show that the intellectual faculties were independent of the organic structure.

There are numerous examples of derangement in the intellectual faculties, where not the least defect could be discovered in the brain after death. In many cases of mental alienation, instead of finding any cause in the brain, disease has been observed in very different parts, as in the liver, bowels, &c. Pinel affirms that the most careful dissections have taught nothing respecting the seat of mental alienation, and that diseases of the brain afford no sufficient data to conclude that it is the exclusive organ of the intellectual faculties.

In order to rectify these statements, so opposite in appearance, we must consider two questions: Was it possible, until lately, to estimate properly the nature of diseases and wounds of the brain? And was it possible before our discoveries to judge correctly of the effects produced by them on the exhibition of intellect? Now, it is evidently impossible to take an exact anatomical account of an organ, not only unknown, but on the structure of which, notions entirely opposite to the truth were entertained. Moreover, authority too often induces us to admit facts which never existed. Morgagni, for instance, maintains that the brains of the proud and stubborn are hard and coriaceous; and that those of the meek, unsteady, aud undecided are soft. Theophilus Bonnet says, that the brains of some who happened to die in anger or fury were hard, dry, and friable. According to Portal, the cerebral convolutions in the insane are shallow; according to Dumas, the brain in reasonable men is of a round figure; this author advances also, that the character of any person is mild or hasty, that his ideas are lively and rational, or heavy and confused, that he is an idiot or a madman, according as his brain is more or less dark in its colour, more or less firm, &c. Such notions are certainly exaggerated; yet can it be supposed that in mad-

ness and idiotism the organ of the mind undergoes no kind of derangement? It seems to me necessary to inquire into what changes may take place in the cerebral mass generally, or in any of its particular parts; and also to consider, whether derangements may not happen, though imperceptible by any of the five external senses. If in one struck dead by lightning, or killed by gout in the stomach, or hydrophobia, or tetanus, no derangement in the nervous system be recognized, are we therefore authorized to say that the nervous system has really suffered no change whatever?

Dr. Gall and I are of opinion that all deranged manifestations of the mind result immediately from some change in the brain. We recognize the remote causes of cerebral diseases often connected with derangements of the abdominal viscera; but we say that its immediate cause resides in the brain. Intestinal worms occasion bad breath, cough, grinding of the teeth, tickling in the nose, blindness, mental derangement, *&c.*; but the bowels, which are irritated, are no more the seat of insanity than of the tickling of the nose, the cough, or the blindness.

It is also true that very considerable injuries of the brain sometimes disturb the mental manifestations very slightly; and, on the contrary, that very slight injuries of the brain are often accompanied with the most violent symptoms. This, however, also happens in other parts of the body. Very large abscesses have been sometimes found in the lungs without having been accompanied during life by any great derangement of the respiration; but the lungs are not less the organ of respiration on this account. Ossifications have sometimes occurred in the heart without any remarkable disturbance of the circulation; the heart, nevertheless, is still the organ of circulation. It is evidently wrong, then, to ascribe to the wound, or to its seat, that which must be attributed to the particular constitution of the patient alone; and thus it is that we may conceive why no bad symptom should occasionally

result from a very considerable injury of the brain in patients but little irritable; whilst, in others very excitable, the slightest wound will produce the most serious consequences.

It still remains for me to mention certain reported cases, in which half of the brain is said to have been found completely destroyed by suppuration, while the intellectual faculties remained unimpaired. Now it seems that in such a case, at least, the half of the mental manifestations ought to have been annihilated. Though these statements bear the stamp of incorrectness, let us admit them as they are related; let us even join to them one made by Dr. Gall, at Vienna. He attended a clergyman in the Theresian Institution, who for a long time had laboured under a pustular erysipelas, which appeared and disappeared from time to time; by degrees his left side became so weak that he could not walk without a stick; and, finally, he was struck with apoplexy, and died in a few hours.

Three days before he had delivered a lecture at the school. On dissecting his head a part of the right hemisphere, as large as the fist, was found changed into a yellowish and grumous substance. Dr. Gall regrets his ignorance of the structure of the brain at that time, which prevented him from examining the case with perfect accuracy. Let us now consider how such facts are to be explained, if the brain be in truth the organ of the mind.

In giving the histories of cerebral injuries, the duplicity of the nervous system has very generally been forgotten. But one half of the brain may be destroyed, and the various faculties still be manifested by the other of the opposite side, just as one of the optic, auditory, or olfactory nerves may be destroyed without being deprived of its function. It is well known too that the two hemispheres of the brain may be in very different states of health. Tiedman relates the case of one Moser, who was insane on one side and observed his insanity with the other. Dr. Gall attended a minister similarly afflicted; for three years he heard himself reproached and abused on his left

side; with his right he commonly appreciated the madness of his left side; sometimes however, when feverish and unwell, he did not judge properly. Long after getting rid of this singular disorder, anger, or a greater indulgence in wine than usual, induced a tendency to relapse.

These occurrences seem more extraordinary than they are in fact, for an opposite state of each hemisphere is not rare; it exists evidently in the hemiplegia: one side is paralysed, deprived of all activity, the other continues to exert its functions, and the patients seem to have lost no faculty of the mind. One half of the tongue is paralysed, one eye is blind, one ear is deaf, while taste remains on one side, the opposite eye sees, and the other ear hears. It sometimes happens that only one hemisphere of the brain is inflamed; and in cases of megrim, the blood-vessels are always fullest on the diseased side. On dissecting a child killed by a violent blow on the right side of his head, the right cerebral hemisphere was found pale and bloodless; the left, on the contrary, was injected and loaded with blood—an evident proof that the hemispheres may be in opposite states. If this child had lived after the accident, it is probable he would have been paralysed on one side, and convulsed on the other. I once dissected the brain of an insane female, and found a portion of the inferior large apparatus of increase (thalamus) of the left side destroyed by suppuration, and the nervous bundles and convolutions connected with it diminished in size; while on the right side, all the parts were larger and in apparent health. These examples suffice to show that the brain is a double organ, that one half may be in a state different from the other, and that every special faculty may be manifested, so long as the organ on which it depends is not utterly destroyed on both sides.

Let us now examine whether or not it has hitherto been possible to judge correctly of deranged mental manifestations. No one feels more sensibly the insufficiency of our actual knowledge of human nature than he who studies the deranged manifesta-

tions of the mind. Pinel despairs of our ever knowing the cause of mental derangements, on account of our ignorance of healthy mental function. I shall here do no more than expose the defects in the methods of the procedure adopted by our predecessors.

We may observe, in all reports upon wounds of the head and injuries of the brain, the following very loose expressions:—The patient continued to walk, to eat, and drink; he had his consciousness entire, *viz.* he knew all around him; he manifested some memory and judgment; consequently, he possessed all the faculties of the mind, none of them were disturbed. If, however, a person of a mild and peaceable character, after being wounded on the head by a stone, become quarrelsome and morose; and if another, whose life had ever been irreproachable, after a similar accident should feel an irresistible inclination to steal, it is evident that, though these persons preserve consciousness, memory, judgment and imagination, we cannot infer, that the injuries inflicted have produced no derangement of the mental functions. Further, animals have consciousness, memory, and judgment; but are they therefore men? If a man were by disease reduced, in point of faculties, to the level of a dog, but still enjoyed the five external senses, as well as some portion of memory and judgment, would he therefore have lost no characteristic faculty of humanity? If partial idiots have perception, memory, and judgment, are all the faculties of the mind manifested? If, in cases of partial insanity, consciousness, memory, and judgment be preserved, and if imagination be even exalted, are all the faculties therefore unimpaired? Finally, if individuals after a concussion of the brain, or a fit of apoplexy, lose the memory of proper names, or of languages, though they preserve the functions of the five senses, memory, and judgment, have they lost nothing whatever? Thus, it is evident that the manifestations of one or more faculties of the mind may be deranged or destroyed, and the patient still be incorrectly said to preserve all the powers which constitute an intellectual and

moral being. It follows also, that hitherto it has been impossible to judge accurately of the effects of diseases and injuries of the brain, because physiologists have considered the general attributes of the understanding only, and been ignorant of the special faculties. From all that has been said, it appears that injuries of the brain must be investigated under the guidance of sounder ideas of the healthy structure and function of that organ, before safe and useful conclusions can be come at in regard to mental aberration.

II. *Hydrocephalus.*

An objection has been founded on observations, which pretend that although the brain was destroyed, dissolved, or disorganized by water, the manifestations of the mind have continued unimpaired.

Zacutus Lusitanus maintains that he saw a child live for three years without brain. He believed that what he saw in the head after death was a double dura matter. Duverney says that he found water only, and no brain, in a head which he dissected. Haller and Soemmerring notice these statements without denying them. Lauffer * speaks of a new-born child whose head contained nothing but water, in which the brain that had once existed was dissolved. This report received, as he maintains, very general accredence, and the phenomenon was spoken of under the name of liquefaction, or solution of the brain.

Anatomists were accustomed to see the brain in its natural state as a compact and solid mass, and if they chanced not to find this solidity of structure, considered the whole organ as dissolved or annihilated. Morgagni, however, reproaches Duverney with his inadvertency, and assures us that in perfectly similar cases, he always found the brain distended into a thin membrane; remarking that the same circumstance had been

* Diss. de Infante sine Cerebro nato. Halæ, 1743.

observed before him by Tulpius, Vesalius, and several other anatomists. In order to answer the objections founded on the statements of Duverney and others, we must consider three points: First, the place where the water is found; then, the change which the cerebral mass has undergone; and lastly, the condition of the mental manifestations.

Sir Everard Home, in his observations on the functions of the brain*, seems to maintain that there is a certain quantity of water in all brains. He even says: "Facts appear to point out the use of the water in the ventricles in the brain, and they account for the great variety which is met with in the form and extent of the posterior cornua of the lateral ventricles, their size varying according to the quantity of water which is necessary to keep up the pressure required." He says: "pressure to a certain degree, uniformly kept up, is necessary to the performance of the healthy functions of the cerebrum; and any increase or diminution of this pressure puts a stop to them." This reasoning is founded on the observation that large hydrocephalic heads often continue to manifest all the functions of the brain.

It is certainly true that the cavities in the brain vary in size, according to the quantity of the collected water. They are, however, very different in the natural state when quite free of fluid; but the accumulation of water is incontestibly the effect of disease; for in animals which are killed, or in men who die a sudden and violent death, no water is found in the ventricles of the brain.

Physicians are not all agreed on the seat of the water in hydrocephalics. I speak here only of those cases in which the skull is distended beyond the natural size; for there are two varieties of this disease, very important to be distinguished in the practice of medicine; the one of these, however, does not belong to this subject. Dr. Baillie, in his morbid anatomy, when treating of hydrocephalus, has not mentioned this differ-

* Philosoph. Transact. for the year 1814, part II. p. 471.

ence. Sir Everard Home, in his observations on the functions of the brain, also confounds the acute and chronic hydrocephalus. He thinks that "the quantity of water may be much increased without material injury to the functions of the brain, when the skull is not ossified; but after that period even a few ounces in the lateral ventricles have been known to produce as much undue pressure as to bring on headache, general uneasiness, a sensation as if the head were too large, loss of spirits, convulsions, loss of memory of recent events, idiotism, insensibility, and death." Now all these symptoms which he here relates, are of an acute nature, and ought to be distinguished from those of the chronic hydrocephalus.

In the hydrocephali which distend the skull to a larger size than is natural, the water is said to be accumulated either in the cavities of the brain, or between the membranes, or between the dura mater and the skull. While the greater number of practitioners consider the two latter varieties as the most common, all physicians admit the three kinds. Professor Walter, at Berlin, has maintained publicly that in sixteen hydrocephalic persons, he found the water external to the brain. Pinel* says, that in hydrocephalus the water is contained between the skull and the dura mater, or between the membranes, and only occasionally in the cavities of the brain.

Odier fancies that the chronic hydrocephalus is always produced in the windings of the pia mater, and he distinguishes it from the acute, which, in his opinion, is formed only by an accumulation in the ventricles; he gives a detailed description of the acute hydrocephalus, calling it internal, in opposition to the hydrocephalus of which I here speak, and which he styles external. Petit, on the contrary, maintains that in all greatly-distended hydrocephalic heads, he found the water in the ventricles, and never between the membranes, or the

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* Loc. cit. p. 474.

† Nosographie Phil. Edit. 3me. t. iii. p. 423.

dura mater and skull. Dr. Gall and I formerly maintained that in large hydrocephalic skulls the liquid always occupied the cavities of the brain; recent observations, however, have convinced me that in some, even of a large size, the water is contained between the brain and the dura mater. In my French work, entitled *Observations sur la Phrénologie,* art. Hydrocephalus, I speak of a child who died at the age of eighteen months, whose body I opened along with Dr. Roberton at Paris; we found two pounds and a half of water between the arachnoid coat and the dura mater, whilst the brain lay in the base of the skull covered with a thick pseudo membrane. The child, though always weakly, manifested a common share of mental functions. Since that time, I have dissected, with M. Breschet at Paris, two new-born children, whose brains were very small, defective, and only developed contiguous to the medulla oblongata and cerebellum, while the rest of the skulls, well enough formed, was filled with water. The most remarkable case of hydrocephalus I have seen, was shown to me by Mr. Morgan and Mr. Keys, surgeons of Guy's Hospital, in London, on my visit to that metropolis in 1825. James Cardinal, whose portrait I have given in this work, (Pl. i. fig. 2,) died at the age of thirty years, a few days before my arrival. The two gentlemen, mentioned above, had opened the head, and found about nine pints of water between the dura mater and the brain, which was placed at the bottom of the skull, and one pint in the lateral ventricles. Informed of my being in London, they were so kind as to allow me to examine, with them, this extraordinary head. An opening under the posterior part of the falx established a communication between the great cavities of the hemispheres and the space between the brain and the dura mater. The corpus callosum appeared wanting, but it was only split all along in the raphe, or middle line; the masses composing it evidently existed on both sides. The lateral ventricles were particularly distended in the posterior lobes; several convolutions of the right side were quite unfolded, whilst those

of the left presented the usual appearance. The convolutions in the middle line of the head above the corpus callosum, which are commonly opposed with the falciform process of the dura mater between them, were raised by the liquid, and formed part of the general surface. The appearance of the anterior and middle lobes scarcely differed from that of the healthy brain: the olfactory nerves were large, those of sight small, and the anterior pair of the corpora quadrigemina very small. The cerebellum was flattened, and its cineritious substance of a very dark hue. The whole of the cerebral mass was soft, and weighed two pounds fourteen ounces and a half.

Let us now examine what change the brain undergoes in dropsy of its cavities. Many anatomists have admitted that the brain in common hydrocephalus was distended like a bladder; but no one knew how this took place; and it seemed inconceivable that a delicate and medullary body, like the brain, could be brought to such thinness by distention, without tearing. Walter, Ackermann, and many others, in admitting the existence of the cerebral mass in hydrocephalic persons, still maintain that it is disorganized. Dr. Gall and I on the other hand hold, that the cerebral substance is not disorganized, and we establish our assertion by anatomical and physiological proofs.

Anatomy shows that the fibres of the brain are vertical or perpendicular to the cavities, and that every convolution consists of two layers, but closely applied to each other. If therefore water be accumulated in the ventricles, so as to act against the convolutions placed around them, it gradually separates the two layers whose natural position is vertical, and makes them assume a horizontal direction. In this manner, the convolutions, in large hydrocephalic skulls, are entirely unfolded, and present the smooth surface of a membranous expansion, which was considered by Zacutus Lusitanus as a second dura mater. If such hydrocephalic heads have not been shaken, and the dissection been made with due caution,

the water is limpid; but if they have been carried from place to place, and rudely handled, it is not astonishing that the water should become turbid, and the brain present something of a dissolved or eroded appearance.

We establish our assertions also by physiology. If the brain be the organ of the mind, and be destroyed in hydrocephalic persons, they must necessarily be incapable of manifesting any mental faculty. One or other of the two following opinions must be entertained: either the brain is the organ of the soul, and not destroyed in such as, affected with hydrocephalus, manifest intellectual faculties; or the brain is not the organ of the soul, because those whose brain is disorganized exhibit propensities, sentiments, and intellectual faculties.

Walter of Berlin, imagining the brain in hydrocephalus to be disorganized, maintained, that in this disease all the intellectual faculties were annihilated. This however is contrary to fact; there are many instances in which all or most of the faculties were exhibited, although the disease was very considerable. Tulpius had seen a hydrocephalic person endowed with understanding, and therefore inferred that the structure of the brain must differ from what is commonly supposed. Camper and many other anatomists speak with amazement of similar cases.

For the sake of adducing still stronger proofs of the brain's being exclusively the organ of the soul, and of refuting at the same time those who deny intellectual faculties to the affected with hydrocephalus, I shall here quote several cases in point. Dr. Gall and I observed for some years a woman with considerable dropsy of the brain, who manifested that share of understanding usually possessed by women of her class. She died at fifty-four years of age of inflammation of the intestinal canal. We found the cavities of the brain containing four pounds of limpid water. We once saw a man of learning, whose skull was much larger than natural, particularly in the anterior and superior part of the forehead. To judge from its

size, there must have been from three to four pounds of water in the cerebral cavities; yet he possessed very extensive knowledge. The only inconvenience which resulted from his peculiar state was that he often fell suddenly asleep in the midst of the most interesting conversation, at table, at the theatre, and elsewhere. At Copenhagen we saw a girl, thirteen years of age, whose head measured twenty-five inches in circumference, nineteen inches from one ear to the other, and as much from the root of the nose to the neck; it must have contained from ten to thirteen pounds of water: although her legs were almost paralytic, and she had to be carried from one place to another, yet she was genteel in her manners, and made as much progress as the other girls at school. At Augsburgh we met with a girl whose head, at thirteen years, resembled in shape and size that of the woman of fifty-four years mentioned above: she was little, but walked well and spoke intelligently. Another female, similarly affected, eleven years of age, was shown to us at Marbourg; and at Bruchsal we found a hydrocephalic girl fourteen years old, who kept her bed constantly; she, although certainly too childish for her age, with understanding enough, prated on all that interested her. Dr. Tobias, of Leipsic, showed us a hydrocephalic head of an extraordinary size. The person had lived thirty-six years, and possessed common understanding; this, however, he lost twelve months before his death, which was caused by a violent fit of anger. Messrs. Laumeyer and Nueffer, at Fribourg in Brisgau, preserve the skeleton of a girl aged seven years whose skull contained seventy ounces of water, and who nevertheless frequently reminded others of events and circumstances she had heard read from the papers some time before. Dr. Maler, of Carlsruhe, related to us the history of one affected with hydrocephalus, who died at twenty years of age, and whose skull contained above ten pounds of water. This individual displayed ordinary understanding. In London I saw four considerable hydrocephalic heads: one was thirty-

three inches in circumference, twenty-four and a half from one ear to the other, and twenty-three and a half from the root of the nose to the nape of the neck.—*(Pl. I. fig. 2.)* Yet this lad, then nineteen years of age, manifested all the moral sentiments and intellectual faculties. He could also read and write tolerably well. A man with a still larger head lived at Musselburgh, near Edinburgh, in Scotland, who showed tolerably great mental functions. These, and many similar examples prove, that hydrocephalic patients are not always entirely destitute of the affective and intellectual faculties.

Such phenomena are easily explained by those who are acquainted with the structure of the convolutions of the brain. They know that even in hydrocephalus of a large size the brain is not disorganized, but that it is either placed on the bottom of the skull, or that the direction of its fibres has been changed from vertical to horizontal. Now the exhibition of the faculties does not depend essentially on the vertical, horizontal, or inclined position of the cerebral fibres. They may even be lengthened without the internal organization of the brain being thereby destroyed. The optic nerve is sometimes elongated by an excrescence pushing the eye-ball out of the orbit, without loss of sight ensuing. All the arguments then which have been founded on hydrocephalus, to prove the brain not the exclusive organ of the soul, fall to the ground.

It is sufficiently well known that Dr. Gall and I were the first to demonstrate the structure which permits so wonderful a change as that which happens in hydrocephalus to occur without total disorganization of the brain. It is therefore rather astonishing, that some late writers speak of the facts, our discovery, as having been perfectly familiar to them for a long time past. Sir Everard Home, after relating the history of a boy affected with water in the brain, whose head measured thirty-three inches in circumference, and whose faculties were unimpaired, proceeds to say: "The preceding

facts explain satisfactorily that the cerebrum is made up of thin convolutions of medullary and cortical substance surrounding the two lateral ventricles which are unfolded, when the cavities of those ventricles are enlarged, and in this unfolded state the functions belonging to this part of the organ can be carried on." Now, our memoir, announcing this truth, was presented to the National Institute of France, in March 1808, and was by their report in the same year made universally known. Sir Everard Home's paper, upon this subject, was read to the Royal Society, in May 1814; six years after our discovery was before every learned society in Europe. I may also mention that before Sir Everard Home read his paper, I had demonstrated the structure of the brain in the Medico-Chirurgical Society in London. Will he maintain that he never heard our discovery spoken of, even in the very vague manner in which he has related it?

III. *Ossified Brains.*

Among other phenomena which, to the superficial observer, seem calculated to refute the principle, that the brain is exclusively the organ of the mind, are the petrified or ossified brains, which, it has been asserted, have not hindered the mind from being manifested. Instead of examining the fact of occurrence, our adversaries, in their eagerness to overturn our opinions, have at once admitted the existence of these petrified brains, because they seem decisive. Dr. Gall and I saw bony masses at Vienna, Leipsic, Amsterdam, Cologne, and Paris, which were always shown to us in triumph as ossified brains, and complete refutations of our position: the brain is the organ of the affective and intellectual faculties. Thomas Bartholin, in 1660, was the first to speak of an ossified brain. An ox slaughtered in 1670, in the Benedictine monastery of St. Justine, near Padua, according to the story of the monk,

who was cook, had a brain as hard as marble. Duverney exhibited such a pretendedly ossified brain to the Academy of Sciences in 1703. Moreschi, professor of Anatomy at Bologna, and Dr. Giro*, say they examined at Rovigo a similarly ossified brain. They cut it horizontally almost on the level with the corpus callosum, to examine the interior parts; and though the colour of the circumference was different from that of the centre, they could not distinguish the cavities, the thalami, the corpora striata, any vestige of the third and fourth ventricles, of the corpora quadrigemina, or of the pineal gland. The cerebellum presented only parallel transverse ridges. The basis of this supposed brain was only uneven, but exhibited no traces of origins of nerves. The ox, moreover, manifested the same inclinations as every other ox, with a sound brain, and was eight years old when killed. Dumas asserts that these facts completely refute our doctrine of the cerebral organs.

The erroneous opinions relative to ossified brains, are still very far from being abandoned, though Vallisneri has shown their falsity and untenableness.

The number of these ossified masses which we ourselves have seen, and the number of which Vallisneri speaks, seem to prove that they occur frequently. Let us, in the first place, see what Vallisneri thinks of them. He shows† that the notion of such a thing as a petrifaction of the brain took its rise only from the ignorance of a Benedictine friar; he states that he has seen the pretended cerebral petrifaction spoken of by the Monk, and says that it is no brain; he farther proves that these masses are merely bony excrescences of the skull. He has therefore made various drawings of the brain of an ox, to show that there is no analogy between the protuberances observable on these excrescences and the convolutions of the

* Gazette de Santé. Paris, Nov. 11, 1809. No. XXXII.

† Opere Physico-Mediche. Venezia, 1733. t. i., Art. Cervello Impetrito.

brain. He shows that an excrescence in his own possession had a much stronger resemblance to the brain of an ox than that which Duverney had caused to be drawn. He consequently reproaches Duverney with his ignorance in thinking that he and Bartholin had alone observed this phenomenon, and expresses the greatest amazement that the Academy of Sciences should have been deceived by that which Duverney presented as an ossified brain. He, moreover, reproaches Duverney for having neglected to open and examine the interior parts, in order to see that there was no vestige of cavities, of corpora striata, or of thalami; and blames his credulity in supporting his assertion only by the story of a butcher.

To the observations of Vallisneri, it may be added, that the part on the surface, called pineal gland by Duverney, is much larger than the pineal gland of an ox; its form is also quite different; and, finally, it is situated on the surface not interiorly, as is the case in nature. In the same manner the part which he considers as a cerebellum with its vermiform process, resembles the natural cerebellum in no wise; and Vallisneri justly remarks that Duverney would have found the brain as well as the bony excrescence, had he himself opened the head; he even states a case in point of a butcher of Modena, who, by proceeding more carefully, found both a brain and a bony excrescence of the skull.

Messrs. Giro and Moreschi maintain that they saw the centrum ovale of Vieussens in the bony excrescence which they possess. This error is easily explained: for as the brain, when cut horizontally, presents a large white surface, called by Vieussens centrum ovale, so these bony excrescences, when sawed in any direction whatever, will also present a white surface like ivory, and this they have considered as a centrum ovale. But why have these gentlemen not found the ventricles, the thalami, the corpora striata, the tubercular quadrigemina, &c.? That, however, which is most inconceivable is, that they found no vestige of nerves, although the ox had preserved

not only its intellectual faculties, but also its five external senses! Moreover, the cerebellum of the ossified brain, of Moreschi and Giro, presents tranverse and parrallel rings and ridges; but the natural figure of the cerebellum of an ox is altogether different.

Dr. Simson* gives an account of the ossified brain of a cow killed at Fettercairn, a village in the county of Angus, in Scotland. He allows that this brain was much larger than the natural one; that the cerebellum, in particular, was six times bigger than usual; that it did not resemble the brain of an ox in shape; that the cerebellum was far above its ordinary level, and much mis-shapen; he adds that one small end was quite rough, and might be suspected of having been joined to, and broken off from, the skull. Dr. Simson, however, thought it was the brain ossified, because the butcher found it in the skull; and because he to whom the cow belonged said it was such. We may add that all those who looked upon it saw it in the same light.

Haller† observed that the ossified brain, which Bartholin speaks of, was only a bony excrescence. Soemmerring advances the same opinion as ourselves, *viz.*, that all ossified brains as they are called, are nothing more than bony excrescences, which spring from the internal surface of the skull; and gradually push the brain from its place without destroying its structure. These excrescences are sometimes seen arising from the external as well as from the internal surface of the skull; sometimes also from both. We saw a specimen of the latter kind at Goettingen, which Peter Frank had presented to the university; and in the anatomical collection of the medical school at Paris, there is a skull with a bony mass protruding both with-

* In an inquiry how far the vital and animal functions are independent on the brain. Edinburgh, 1752.

† Phy. t. iv. p. 356.

out and within. The excrescences are sometimes spongy, soft, and smooth; but more usually solid, hard, and uneven, or gibbous, like stalactites or cauliflowers. These gibbosities have been mistaken by superficial observers for convolutions of the brain; but they really present nothing analogous to such as are found in nature. In every one of them the place of adhesion to the surface of the skull by a root larger or smaller, may be distinguished, and the whole mass is frequently larger than a healthy ox's brain. The half of such a fancied petrified brain, shown to us by Professor Bonn, of Amsterdam, was larger than a whole natural brain.

As to the influence of these bony excrescences upon the cerebral functions, it is certain that, notwithstanding their existence, men and animals can live for many years, and manifest various faculties. It is, however, improbable that the faculties suffer no derangement from their presence; as in all the examples, except that cited by Duverney, which he himself did not see, the same symptoms have been remarked which take place when the brain is compressed from any other cause. The cow of which Dr. Simson speaks, ate and drank, saw and heard, as well as any other animal of the kind, but she had a difficulty of breathing which made her snort in her sleep; and instead of getting flesh when she was fed to be slaughtered, she rather pined away and became leaner. The pressure in such cases does the less harm, because the excrescence grows very slowly. Although I have not yet had an opportunity of observing one, I think it very probable that the brain is not compressed in proportion as the bony excrescence increases, but that the cavities of the skull become larger by degrees, just as happens in dropsy of the brain. Whatever then has been said regarding ossified brains, must be attributed to ignorance of anatomy and physiology. Some share of the blame may also attach to inaccurate observations and excessive love of the marvellous. I repeat here what Dr. Gall and I have always said, that if

ever a brain be ossified, and the animal preserve its intellectual faculties, we shall be the first to declare our doctrine of the functions of the brain a purely chimerical fabrication.

IV. *Metaphysicians.*

Metaphysicians are pleased to say that the mind acts independently of organization, and adduce, in support of their opinion, the fact of the mind's having no consciousness of the organic conditions which Phrenology assigns as necessary to its manifestation.

It is allowed that the mind does not know, by intuition, that its operations are performed by means of the cerebral organization; but it is a general truth that the mind requires to observe the instruments of its actions, in order to know them. Voluntary motion is impossible without nerves and muscles, but the mind in itself has no consciousness of the existence of these organs. In the same way the external senses cannot exist without the respective nerves of each; the mind cannot see without eyes, nor hear without ears, but it becomes acquainted with these nervous apparatuses or instruments only by observation. In precisely the same manner it is that the mind knows the instruments of its affective and intellectual operations: by observation alone. Thus, the arguments of the metaphysicians against the dependence of the mental functions on the brain are unsound, and leave the first principle of Phrenology: the brain is the organ of the mind, in its original integrity.

CHAPTER II.

Of the absolute Size of the Brain.

The greater number of natural philosophers, convinced that the brain is the organ of understanding, have concluded that its functions must be proportionate to its size. The brain of man was found larger than that of the majority of tame animals, and, without a more strict examination of living beings, man's superiority was at once attributed to the greater absolute size of his brain; Erasistratus, Aristotle, Pliny, Galen, Portal*, and others, have therefore said, that man has the largest brain of all animals. Modern discoveries, however, have shown that whales and elephants have larger brains than man; and those who measure the faculties of animal life according to the absolute size of the brain, are thereby proved to be in error; for whatever the understanding of the elephant may be, and with whatever justice the whale be declared king of the ocean, no one will attribute either to the one or to the other the superior faculties which constitute the distinguishing character of man. Besides, when we study nature more closely, we find the brain in the monkey and dog smaller than in the ox, ass, and hog, yet the former approach much nearer to man in intellectual endowments than the latter. Moreover, many animals, as the wolf, tiger, sheep, and roe, may be ranged in the same class, the size of their brain alone considered; yet their dispositions are very different, and often opposite. It is the same with the sparrow-hawk, cock, and pigeon. Finally, we see that very small brains produce the most surprising effects. Observe the honey-bee and the ant, contemplate the economy of their dwellings, their local memory, the care they take of their progeny, their anger and revenge, and their natural language! Is there any thing more curious than the conic hole of the pyrmicoleon, than the web of the spider? Do we

* Anatomie Medicale, t. iv. p. 30.

not observe the jealousy of the stag in the cock; the propensity to fight of the wild boar in the red-breast, &c.? And if the absolute size of the cerebral mass were a sufficient measure of the affective and the intellectual faculties, ought not all animals which have the same quantity of brain to manifest absolutely the same faculties? It would then be inexplicable why one tribe of animals lives in society, another in solitude; why one takes care of its progeny, and another does not; why one constructs, another sings, &c. Nay, more than this, I may state, that it is not possible even to measure the faculties in individuals of the same kind according to the absolute size of the brain. Such views show that we must search for another measure of the faculties of the mind than the absolute size of its organ.

CHAPTER III.

Of the Size of the Brain compared with that of the Body and with that of the Nerves.

The brain of the elephant and whale is greater than that of man, but their bodies are also much larger. This view seemed to prove the superiority of the human brain, and anatomists now said, not that man had *absolutely* the largest brain, but that he had the largest brain *in proportion* to his body. All nerves being considered as prolongations of the cerebral mass and proportionate to the body, the moral and intellectual superiority of man was naturally supposed to be indicated by the size of the brain, compared with that of the body. A large body will require the greater part of the brain and nervous system to be employed in its functions, and there will then remain a small portion for the exhibition of superior faculties.

The brains of reptiles and fishes are very small in proportion

to their bodies. A crocodile of twelve, a serpent of eighteen feet, and a turtle of a couple of cwts., have brains that scarcely weigh one drachm each. There are insects in which the nerve of a single sense exceeds the size of their brain. The brain of the great eagle of the Alps (læmmergeyer) is almost as small as that of the raven, and the turkey-cock has no greater mass of brain than the parrot or crow. These facts afforded the inference that the faculties are in the ratio of the brain to the body.

This conclusion, however, was too hastily drawn, and was not grounded upon a sufficient number of observations; Wrisberg, Soemmerring, Blumenbach, Cuvier, and other anatomists, on putting the principle to the test, found that the sparrow, canary-bird, linnet, red-breast, bullfinch, and several species of monkeys, have in proportion to their bodies more brain than man. The intellectual faculties of these animals ought therefore to surpass those of man; and the rat and the mouse ought to have more understanding than the horse, stag, dog, and elephant, because the former, proportionately to their bodies, have a more considerable quantity of brain. Were such a principle true, there should exist no difference in the faculties of different species of animals whose brains bear a like relative proportion to their bodies Moreover it would be very difficult to determine the exact ratio of the brain to the body and to the nerves in all cases. The proportions stated by Cuvier for man are evidently incorrect. In adults, he says, it is as one to thirty-five. Our observations lead us to conclude, that the proportion of one to forty, or fifty, or even sixty, is more general. For suppose a grown-up man to weigh only a hundred and twenty, and his brain from two to three pounds, the proportion fixed by Cuvier will be inexact. Besides, this anatomist does not say how he separated the brain from its connexions; what portions of the nerves and membranes he left; whether the blood-vessels were empty or full; nor the age of the subjects of his comparisons.

Haller remarked that children had a larger brain than adults in proportion to their body, and consequently that, if faculties were measurable by the proportionate size of the brain, they ought to excel grown-up persons in understanding. It may however be replied that the brain of children is not perfectly developed, and is therefore unfit to manifest the intellectual faculties. Haller further observed, and Soemmerring and Cuvier repeat after him, that it is very difficult to determine the proportion of the brain to the body, because the body grows lean or fat, and augments or diminishes by half its weight, while the brain undergoes no change. The latter part of this proposition is refuted by experience; for though no adipose substance be deposited in the brain more than in the lungs, it still participates in the nutrition of the body as well as every other organic part, and, therefore, its convolutions are more plump and more closely packed together, and the whole brain is heavier in well-nourished men and animals, in the flower of youth and vigour, than in the old, lean, and emaciated, or in those who have died of hunger or of lingering diseases. Dr. Gall and I have given some attention to this point. The results of our observations are as I have just stated them. Haller's remarks would not suffice, therefore, to refute the idea of estimating the mental faculties according to the proportionate size of the brain.

Wrisberg and Soemmerring thought they might proceed in a surer way, if they determined the faculties according to the proportion betwixt the brain and the nerves; for these, they saw, were much more considerable in many animals than in man. But neither is the ratio in this case universal. The seal, in proportion to its nerves, has a larger brain than the house-dog, and the porpoise more than the ourang-outang; yet we do not perceive a corresponding ratio in the faculties of these animals.

Comparisons of the brain with the spinal marrow, instituted

by Soemmerring, Ebel, and Cuvier*, are not more valuable or satisfactory than the others I have mentioned. Cuvier himself quotes exceptions; in the porpoise, for instance. M. de Blanville, too, is wrong in saying that the size of the occipital hole of the skull indicates the proportion of the spinal marrow to the brain. The occipital hole bears relation to the medulla oblongata, and by no means to the spinal marrow. Besides, there is no fixed proportion between the spinal marrow, nor even the occipital hole and the brain; this may be large, and the occipital hole and the spinal marrow small, or *vice versâ;* a case which happens not only in different species of animals, but even in different individuals of the same species. Neither could this proportion, did it exist, be known during life. It would, consequently, be useless in anthropological investigations.

CHAPTER IV.

Of the Facial Angle of Camper; of the Occipital angle of Dauberton; and the Size of the Brain in proportion to the Face and Neck.

In order to measure the extent of the brain, and, as he imagined, the corresponding energy of the intellectual faculties, Camper drew a line touching the most prominent part of the forehead and the upper lip, and another from the orifice of the external ear to the end of the upper front teeth, and measuring the angle at the intersection of the two lines, he concluded, that the more it was obtuse, the higher were the intellectual faculties, and the more acute the angle, the more stupid the individual. Lavater, Cuvier, Richerand, and a great

* Leçons d'Anatomie comparée, t. ii. p. 150.

number of anatomists and physiologists, approve of this facial angle, as it is called. Lavater's well-known progressive scale of heads, from the frog to the Apollo Belvidere, was composed from the idea it gave. Cuvier also arranged several tables, indicative of the facial angles of men and different animals; he fixed that of Europeans at ninety degrees in infancy, at eighty-five in an adult, and in an old decrepit man at fifty degrees. This manner, however, of measuring the intellectual faculties is not more correct than those I have already mentioned. The facial angle applies only to the parts of the brain situated in the forehead, and is inapplicable to all the lateral and posterior organs: hence the facial angle could, even if there were no other objection, indicate those faculties only whose organs constitute the forehead. Besides, it is quite impossible to determine in a general way the proportion of the forehead to the face. In new-born children the forehead is flat; but from three months to eight or ten years of age, it is ordinarily prominent, and forms a more obtuse angle than at birth or in the adult. Hence Cuvier errs in saying that the facial angle decreases in proportion as the child advances in age. Even if this were the fact, it would only be possible to say that the facial angle will be of so many degrees in grown up and in old persons, when its amount in infancy is known. But it is utterly impossible to draw general conclusions from individual cases, and, among a hundred persons, no two have the facial angle alike. Yet Cuvier would have us believe that all children, all grown-up, and all old Europeans, ought to have precisely the same proportion of brain to the face. Moreover, this facial angle is useless, when we come to creatures lower in the scale than man; for Blumenbach has observed that three-fourths of all known animals have nearly the same facial angle, and are nevertheless endowed with very different and opposite propensities. Finally, Cuvier himself has remarked that the brain is not placed close to the external forehead in all animals, but that in a great number the two

plates of the skull being separated, the brain lies at a considerable depth beneath. This occurs not only among the lower animals, but also in the aged of the human kind, between the two plates of whose skulls there is often a considerable space. In hogs, the brain lies one inch, and in the elephant thirteen inches deeper than is indicated by the external table of the skull. Cuvier, to overcome this obstacle to precise observation, draws the tangent or vertical line from the internal plate. In many animals, as in some varieties of the cat tribes and of the rodentia, the brain inclines so much downwards behind and under the frontal sinus, that it becomes impossible to draw a facial angle from the most prominent point of the forehead.

The facial angle is moreover a very imperfect means of estimating the faculties of man. We have seen negroes with extremely prominent jaw-bones manifest great intellectual faculties, because their foreheads were large. Their facial angle, however, would have made them inferior to many stupid Europeans, whose foreheads are small, but whose jaws project little. From all these considerations it follows, that the facial angle, as a means of measuring the moral sentiments and intellectual faculties, is perfectly useless.

Daubenton's occipital angle is formed by a horizontal line, drawn from the floor of the orbit to the posterior edge of the occipital foramen, and a vertical line cutting this and passing between the condyles over the surface of the occiput. Now this occipital angle, according to the observation of Blumenbach, measures from eighty to ninety degrees in all animals, and, consequently, does not differ proportionately to their varied faculties. The occipital angle would also indicate the developement of the occiput only, and not of the lateral and superior parts of the brain; this alone is sufficient to prove its inutility.

Some physiologists, as Soemmerring and Cuvier, have compared the size of the brain in general with the state of the face;

and, according to them, animals are stupid as the face is large in proportion to the brain. Cuvier calls the senses of smell and taste, whose apparatus occupies a principal part of the face, the most brutish functions. Cuvier saws the skulls vertically and longitudinally, in order to compare with ease the area of the cerebral cavity with the size of the face.

Ancient artists appear to have observed a certain proportion between the forehead and the face; their statues of high priests, sacrificators, demi-gods, gods, and especially of Jupiter, have large, high, and vaulted foreheads. The superiority, however, of the intellectual faculties does not result from the proportion of the forehead to the face, but from the developement of the forehead itself. There have been great men with large faces, and very prominent jaw-bones. Leo X., Montaigne, Leibnitz, Haller, Mirabeau, &c., had large faces and very considerable brains. Bossuet, Voltaire, and Kant had, on the contrary, small faces and large brains. Soemmerring errs also in saying that the skulls of women are larger in proportion to their face than those of men. The idea too is evidently incorrect as regards many animals; for the face of the sloth and seal is to their brain smaller than that of the stag, horse, and ox; yet no one will maintain that the former animals excel the latter in intellectual faculties. Finally, the notion is inapplicable to birds, as Cuvier himself allows.

Plato in ancient times, and Bichat and Richerand in our days, have maintained that there is a proportion between the intellectual faculties and the length of the neck. According to them the intellectual faculties are weaker the longer the neck is, because the brain is more removed from the heart, and consequently is less excited by the blood. This assertion is too evidently opposed to all natural history and physiology to render any demonstration of its falsehood necessary.

CHAPTER V.

On the Cerebral Parts compared with one another.

The cerebral parts have also been compared with each other for the purpose of detecting their functions. Cuvier says * that it is possible to determine the exact proportion of the cerebellum to the brain, because health and disease produce no change upon the cerebral mass; and he has composed several tables illustrative of this point. He finds the proportion of the cerebellum to the brain to be in man as one to nine; in the saïmiri as one to fourteen; in the ox as one to nine, *&c.* Now even these few examples prove that the intellectual faculties cannot be measured by the proportion which the cerebellum bears to the brain; for if, according to the opinion of Malacarne, the cerebellum were the organ of understanding, the saïmiri ought to have more intellect than man; if the brain be the organ of the feelings and intellectual faculties, which is our doctrine, the saïmiri ought to have less of these than the ox, and the ox be upon a par with the human kind.

It does not appear necessary that the brain, or its parts, should always participate in the healthy and diseased states of the rest of the body; for why should not that happen with the cerebral parts, which occurs in other organs? every organ of sense, and every viscus may fall separately into disease, and the rest of the body remain in health. In the same way, each cerebral part may be diseased individually. Even in admitting that the whole brain is equally influenced by the healthy or diseased state of the body, it may still be asked, whether there be any determinate proportion between the brain and the cerebellum, and any between the particular parts of the brain? The answer must be affirmative in one respect and negative in another. The constituent parts of every organ are proportionate

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* *Loc. cit.* p. 152.

to each other, as the cineritious and white substances, the different apparatuses of increase, the ganglia and the number of fibres which spring out of them, &c.; but the different cerebral systems, constituting the particular organs which manifest determinate faculties, are in no constant proportion to each other. There are large brains joined to small cerebella, and *vice versâ.* The cerebellum in youth is smaller in proportion to the brain than it is in mature years. Sometimes one, sometimes another part of the brain, sometimes the forehead, sometimes the posterior part is most developed. The proportions of the particular cerebral parts to each other are the more varied, the more numerous they are. Hence the almost infinite variety of size and form of head observable in the human species. Soemmerring, therefore, errs in saying that in sound brains the position and mutual connexion of all the cerebral parts are invariable, and that no considerable difference in form and size is to be seen among the brains of different men.

From the preceding considerations it follows that the faculties of the mind cannot be determined, either from the form and size of the whole head, or from comparisons of one part with another. Another series of observations must therefore be begun, in order to point out the relations between the mind and the brain.

SECTION IV.

The Brain is an aggregate of Organs.

The brain is exclusively the organ of the manifestations of the mind; but it remains for us to investigate whether the whole of that viscus is to be considered as one single organ, or as an aggregate of as many particular and independent organs as there are particular and independent species of manifestations of the mind. On this subject philosophical writings contain the most absurd and contradictory opinions. Those who believe in the singleness of the soul, conclude that its organ must be single also; others, who examine the particular faculties of the soul, maintain that every special faculty must appertain to a particular organ.

As soon as philosophers began to pay attention to the beings of nature, it became necessary to divide them into numerous classes. Moses speaks of the brutes which live and feel, and those which reason. The Greek philosophers, calling the cause of every phenomenon—soul, spoke of a soul of plants, a soul of animals, and a soul of man. They also admitted a vegetative and a sensitive soul. The inclinations were regarded as the result of the *animus*, and the intellect and reason as the apanage of the *mens*. Pythagoras, St. Paul, Galen, Gilbert, Gassendi, Bacon, Van Helmont, Wepfer, Leibnitz, Fr. Hoffmann, Haller, Blumenbach, Soemmerring, Reil, Barthez, &c., all suppose the various phenomena of animals and man as dependent on the existence of different causes. Plato and several ancient writers speak of an unreasonable and of a reasonable soul. Those who admit only one soul in man, as Anaxagoras, Aristotle, Thomas Aquinas, Descartes, Stahl, &c., are obliged to acknowledge it possessed of at least several faculties. St. Augustin deter-

mined with great exactness and faculties which are common to man and animal, and those which are proper to man. Malebranche, and many other philosophers, speak of principal and secondary faculties: the principal are understanding and will; the secondary are subdivisions of understanding—perception, memory, judgment, and imagination; and of will, inclination, desire, affections, and passions. Some authors have even further subdivided these special faculties; Vieussens speaks of two kinds of imagination; and others admit several kinds of memory, as a local memory, a verbal memory, a memory of facts, and a memory of time. Thus it is clear that various principles, or various faculties of the same principle, have been admitted at all times to account for the phenomena of mind.

As the principles or the faculties came to be divided and subdivided, so different seats were also assigned to them. The rational soul was placed in the head, the irrational in the viscera of the abdomen. The ventricles of the brain have at all times been considered as of prime importance; the Arabs placed common sense in the anterior cavity, imagination in the second, judgment in the third, and memory in the fourth. For several centuries the brain was considered as the organ of perception, and the cerebellum as the organ of memory, the strength of which was supposed to be indicated by the protuberance of the occiput. St. Gregorius Nyssenus, that he might explain why the functions of the mind are not troubled, although the different senses propagate different impressions, compares the brain to a town with several entrances and a great number of streets, by means of which it is possible to arrive at the same point. Nemesius, the first bishop of Emesa, in the reign of Theodosius, taught that sensation has its seat in the anterior, memory in the middle, and understanding in the posterior ventricles. Albertus Magnus, archbishop of Ratisbon, in the thirteenth century, delineated a head, on which he indicated the seats of different faculties of the mind. He placed common sense in the forehead,

or in the first ventricle of the brain, cogitation and judgment in the second, and memory and the moving power in the third. Peter de Montagnana, in 1491, published a drawing of a head on which the seat of sensus communis, of the cellula imaginativa, cellula æstimativa seu cogitativa, cellula memorativa, and cellula rationalis were exhibited. Bernard Gordon and Ludovico Dolci published similar delineations. Both placed common sense in the forehead, and imagination behind it. According to Dolci, understanding was in the cerebellum, and memory occupied a lower seat in the neck. Bernard Gordon placed the cellula cogitativa at the vertex. According to Serveto, the anterior ventricles receive the images on impressions from without; the third ventricle is the seat of thought, the aqueduct of Sylvius of the soul, and the fourth ventricle of memory. Willis considered the corpora striata to be the seat of sensation and attention, the medullary matter of memory, the corpus callosum of reflection, whilst the moving spirits emanated from the cerebellum.

Charles Bonnet regarded each fibre of the brain as a particular organ of the soul. Boerhaave said, that imagination and judgment must be attached to different seats, because the former was active in dreaming, the latter in watching. Haller and Van Swieten* fancied that the internal senses occupied different places of the brain; but they considered its organization as too complicated, too intricate, and too difficult of investigation, to permit us to hope that we should ever be able to point out the seat of memory, of judgment, or of imagination. Professor Mayer, of Frankfort on the Oder, thought it probable that the soul exercised its different faculties in different parts of the brain, and was disposed to look on the cineritious substance as the organ of memory, and on the cerebellum as the instrument of abstract ideas. Prochaska believed it more than probable that each in-

* Van Swieten, t. ii. p. 454. "Quis memoriæ et rationis sedem in hoc mirabili et intricatissimo organo determinare poterit?"

ternal sense was attached to a particular organ. Plattner spoke of two organs of the soul, a superior and an inferior. Malacarne could not imagine the medullary substance of the brain as every where adapted to receive the same impressions; he denied the central point of the nerves, considered the cerebellum as the seat of the intellectual faculties, whose strength he estimated according to the number of lamellæ of which this part was composed. Tiedemann, Wrisberg, Soemmerring, and an immense number of physiologists and philosophers, have admitted a plurality of organs, and maintained that different parts of the brain were destined to dissimilar functions.

These quotations, which might be greatly multiplied, show that the idea of a plurality of mental organs as well as faculties is very old, and that they who call it an invention of Dr. Gall are in error.

Before proceeding to the essential part of my subject—the determination of the faculties of the mind and their special and respective organs, I shall examine in a general way the proofs which convince us that the brain is a congeries or aggregate of different organs.

It is a general observation that nature, to produce dissimilar effects, has varied the material condition of bodies. This is seen throughout the world: every salt and every metal has its own crystallization; every plant has its particular structure; even the parts of the same tree performing different offices, as wood, bark, leaves, flowers, and fruit, have varying qualities. The organization of every variety of animal, and of every part of the same animal, is also modified; there is a particular organ for every function; the liver for the secretion of bile, the heart for circulation, and the lungs for respiration. The five external senses are separate and independent of each other. Nature is not so strongly attached to simplicity and unity as certain speculative philosophers are pleased to maintain. This plurality and independent existence of the organs of automatic life and

the five senses renders it probable that the different internal sensations and functions of the mind are also manifested by different and independent organs.

Besides analogy, there are still other proofs of this furnished by the psychology of animals and man in the state of health and disease. The brains of different animals should be different, because their faculties vary. The beaver which builds a hut, the dog which hunts, the blackbird which sings, the swallow which migrates, must have brains whose organization differs widely. Thus it is not a matter of indifference to have a brain of this or of that kind. Even individuals of the same species do not possess all faculties in the same degree: some excel generally, others are middling in all things; some are geniuses, others are idiots. The organization of the brain in all these cases cannot be equally perfect. Moreover, if the brain were not composed of different organs, why should understanding increase as it becomes complicated? The cerebral organization of the different sexes at least should be modified; for certain faculties are more active in females, and others in males. These modified manifestations are easily understood, if we admit that certain organs are more developed in males, and others in females.

Further, in the same individual certain propensities, sentiments, and intellectual faculties are manifested with great energy, while others scarcely appear. One may excel in verbal memory, and be incapable of combining two philosophical ideas; another may be a great painter and a bad musician or a miserable poet; and a third a great poet and a bad general; piety and stupidity, and piety and intelligence, may be conjoined. Every one has his peculiar gifts. Hence the same mass of brain cannot preside over dissimilar functions. If there were but one organ of sense for all impressions, all should be felt as soon as one was experienced; but the external senses, being attached to different organs, one of them may be weak and another strong. It is the same with the internal senses: if the

same part were the organ of every faculty, how could the mind, by means of a single instrument, manifest one faculty in perfection, and another in a very limited manner?

Nor are all the propensities and intellectual faculties manifested simultaneously; several appear at an earlier, several at a later period. Some are very energetic in children, others appear only in adult age; some disappear at the age of fifty or sixty, and others last till ninety or a hundred. Now if every faculty were dependent on the same organ, all ought to appear and disappear simultaneously. All these difficulties are removed, if we admit different organs which are developed, and which diminish, at different periods, as happens amongst the external senses. Smell and taste appear earlier than sight and hearing, because their organs are sooner developed.

The faculties of animal life cannot act incessantly, they require repose. Study of the same subject too long protracted causes fatigue; by changing this we may still continue our labours. Now if the brain were a single organ, that performed all the functions of the mind, why should it not be still further fatigued by this new species of action? Although our eyes be fatigued by looking at pictures, we can still listen to music, because there is a particular organ for each of these sorts of impression. Such considerations are very important in medicine, and by attending to them we may often prevent partial insanities: if we see that a person has one organ very active, whether from great size, or excessive irritability, all that has any relation to the peculiar part must be carefully avoided, and the activity of the other faculties be aroused.

As during watching the same organ is not always active, but reposes at intervals; so during sleep all the organs do not sink into inactivity together, but a particular one occasionally continues its functions, and then the peculiar state called dreaming supervenes. Watching is the state in which the will can call into action the organs of the intellectual faculties, of the five senses and of voluntary motion; but it is most incorrect

to define watching, the state in which all these organs are active; for it never happens that all the faculties are so at the same time. Every corporeal organ being fatigued takes rest, and this state of rest is sleep; but single, or even several organs, may be active while the others repose. The peculiar sensations or ideas which result from this partial or particular state of activity, constitute dreams. These are more or less complicated according to the number of the organs active. It may here be asked, whether the soul or mind can ever be without all idea? It was formerly a general opinion that activity is the essence of the soul; and it was maintained that in the deepest and most complete sleep it still continued to act and to think, only that no one had consciousness of it. But this must be regarded as an assertion divested of every proof that could assure us of such a state of action. At all events the state of dreaming proves the plurality of the organs of the affective and intellectual faculties; for it would be impossible to experience, during dreams, a variety of ideas and sensations, if the brain were a single organ.

Somnambulism also proves the plurality of the organs. This is a state of incomplete sleep, wherein several organs are watching. Now it is known that the brain takes cognizance of the external world by means of the five external senses. If, during sleep, particular organs act, dreams arise; and if the muscles be excited, motion follows, or the sleeper walks. Many people, indeed, speak in their sleep; others hear and answer in addition; and some rise and walk about, doing various acts. This is somnambulism. Now as the ear can hear, so may the eye see, while the other organs continue asleep; and there are positive facts which prove, that several persons in the state of somnambulism have the sense of sight, their eyes however being open, not shut, as has been reported. Convulsive fits also occur, in which the patients see without hearing.

Some somnambulists have even done things of which they

were incapable when watching; and dreaming persons sometimes reason better than they do when awake. When we would reflect deeply upon any subject, we escape from the noise of the world and external impressions by covering our eyes with the hands; and putting a great number of organs to rest, we endeavour to concentrate all vital power in one or in several. In dreaming and in somnambulism this naturally happens, the functions of the active organs are then often more perfect and more energetic, the sensations more lively, and the reflections deeper than in the state of watching. Unaware of the danger they encounter, somnambulists do acts which, though possible, they would not attempt were they awake. They ought, therefore, never to be awakened when seen in dangerous situations.

Inspirations, visions, and similar phenomena can only be explained by admitting a plurality of organs. They consequently contribute to demonstrate that position. In order to understand the nature of visions, it is necessary to bear in mind what I have said of dreaming. The external world is then represented inwardly: we see our friends or our enemies; we speak, walk, eat, drink, sing, hear music, &c., and all this happens in our dreaming brains only. Visions are these internal sensations or ideas so strongly pictured forth, that though aroused and awake, the person still refers them outwards, and cannot help considering them as realities. These internal perceptions, when transitory, are of no moment, but when permanent, they indicate a true disease of some part of the brain.

From the preceding considerations, we may now explain, why many persons fancy that they see spirits invisible to others; believe themselves accompanied by demons; and imagine that they converse with the devil or with angels. It is even known that such illusions have been produced by the external application of narcotic ointments, composed of dulcamara, belladonna, stramonium, hyosciamus, opium, &c.

Disease also contributes to prove the plurality of the cerebral

organs; for how is it possible to combine the fact of partial insanities with the idea of unity of the brain? It is with the cerebral parts as with the nerves of the external senses. Any nerve may be diseased, while the others remain healthy; we may be blind and hear, or be deaf and see. Dr. Parry, of Bath, told me, that in one of his patients, while the motion of the whole tongue was perfect, the taste of one side was impaired. Analogous facts are generally known to medical men; why should not the cerebral parts be similarly affected? One faculty of the mind is often deranged, while all the others remain unimpaired. Monomaniæ, or fixed ideas, may be explained by this consideration. There are also madmen who are reasonable only in one kind of mental manifestation. I know the case of a chemist who is mad in every thing except chemistry; and of an embroiderer who, during her fits, and in the midst of the greatest absurdities, calculates precisely how much stuff is necessary for any particular piece of work. From all these considerations it follows, that there are as many organs as special and independent faculties; and consequently that the brain cannot be a single organ, but must be composed of several. I shall now answer the most important objections to this principle.

Objections.

I.—*Unity of Consciousness.*

Metaphysicians incessantly repeat that the organ of the soul cannot be complicated, because consciousness is single. This argument is very old. It has been made use of against Boerhaave, Haller, and Van Swieten, who commented on the duplicity, and consequently on the plurality of the organs. Hippocrates himself said, that the brain of man as well as of animals is double. Van Swieten observes that as the consciousness of impressions in two similar organs is single, as for ex-

ample in the two ears, two eyes, &c., so mental consciousness generally is single, though the brain be double. The phenomenon of single consciousness may never be explained, but the truth of the brain being composed of two halves, each made up of different parts, will not therefore be impugned. Vegetative life is composed of different functions performed by different organs. Still it is always one, though more or less complicated in different kinds of animals. Animal life, or the exhibition of affective and intellectual faculties, is also more or less complicated in different beings; and the various faculties are manifested by means of peculiar organs. These exert a mutual influence, on the due continuance of which the unity of animal life depends; for, if this influence be deranged, the unity of animal life is deranged also. It is not true that consciousness is always single, either in reference to the external senses or to the internal organs. There are diseased persons who see objects double, and all monomaniacs have a complicated consciousness. Tiedemann speaks of one Moser, who was alienated on one side of his brain, and observed his madness with the other. One of Dr. Gall's friends, a physician, often complained that he could not think with the left side of his head; the right side was one inch higher than the left. Dr. Gall attended a gentleman who for three years heard peasants insulting him on his left side. He commonly discerned his derangement and rectified his error; but if he took a little too much wine, or had a fit of fever, he always imagined there were voices abusing him. Numbers of madmen hear angels singing or the devil roaring, only on one side. Now as the hemispheres may be in quite opposite states, so may the individual organs of each be differently affected. In treating of the functions of the five senses, I shall examine the various opinions which have been broached to explain single consciousness; but whether any of these be found satisfactory or not, it will still remain indubitable that all the organs of animal life are double.

II.

It is also objected that, in conceiving the brain composed of many organs, its unity is destroyed, whilst all organic parts are evidently dependent on each other. It is certainly impossible to deny the mutual influence and dependence of the different organs, and no one can insist upon this truth more than I do. There is however a great difference between saying that the various organic parts exert a mutual influence, and saying that each part does not perform its own particular function. This may be illustrated from vegetative and animal life. Digestion is necessary to the circulation of the blood, and to the secretion of bile; but does the stomach effect the circulation of the blood, or the secretion of the bile? Nutrition depends on digestion, chylification, sanguification, respiration, circulation, and other auxiliary functions; but is not each of these functions the office of some particular organ? We observe the same in animal life. Without the auditory apparatus we could not hear any language; but does hearing invent the vocal signs? We shall afterwards see that we cannot arrive at certain ideas without the external senses, but that still the external senses do not produce the conceptions of these ideas. Again, whatever nourishes the brain contributes to its evolution, as is the case with the eyes, the ears, &c.; and no part of the body detached from it can preserve its perfect organization, or perform its function; but can we therefore say that the eye does not see, that the ear does not hear?

III.

The particular organs of the brain, it is objected again, are not so distinctly separated as the nerves of the five external senses. It is true the limits or lines of separation cannot be exactly determined between the different organs, but neither can they in the case of the five external senses. The nerves of motion have not yet been separated from the nerves of feel-

ing in the mass of the spinal marrow, though they must be different. The structure of the skin also must vary at different places, as is evident by the exhalations arising from it, and the hair which grows on various parts of it; but this difference has not yet been demonstrated. Neither the limits of the olfactory nerve, nor of the nerve of sight, are more distinct than are the limits of the fibrous bundles of the cerebral organs. Notwithstanding, however, we can demonstrate the relations between these bundles and the affective and intellectual faculties. Anatomy shows that the bundles which form the convolutions situated in the forehead are small, but numerous, while the posterior bundles are less numerous, but large; and we shall see that the faculties of the forehead are more numerous, but less energetic, than those whose organs are situated in the posterior and superior parts of the head.

IV.

The comparison of the internal organs with the five external senses is rejected as affording any proof of the plurality of the organs, because the five external senses may be reduced to a single sense, sensation, just as all the internal faculties may be reduced to the faculty of thinking. It is true that the five external senses only operate some kind of sensation; but sensation in this sense is a general expression, and specific terms are required to indicate particular objects. Gravity, density, volume, &c., are general expressions in physics; but it is necessary to specify determinate qualities to indicate the peculiar bodies of which we speak, as gold, silver, copper, iron, &c. *Life* is a general expression, and life's common phenomena, birth, nutrition, increase, decrease, and death, are observed in all living beings, in plants and in animals. It is, however, necessary to discriminate vegetation from animalization, since nutrition is modified in plants and animals. *Secretion* is a general expression; but each particular sort must be indicated, and is actually performed by a particular organ; as bile

by the liver, urine by the kidneys, &c. We must proceed in a similar manner in considering animal life: sensation is a general expression, and every kind of sensation must be specified. The having sensations of light, of sound, of taste, or of smell, are very different things. Each of these particular sensations is performed by a particular organ. The faculty of thinking is a common power; but thoughts of space, of form, colour, tone, number, &c., are particular kinds of this faculty, which are manifested by appropriate and special organs. This objection, therefore, instead of refuting the notion of the plurality of the organs, proves the necessity of its admission.

V.

Another objection is the following: the nerves of the five external senses are homogeneous, and their functions only differ on account of their external apparatus. The auditory nerve in the eye, it is said, would see, and the olfactory nerve in the ear would hear; therefore, the internal organs, being destitute of such external apparatus, necessarily perform the same functions. This opinion is still pretty general. As a polypus may be divided into several pieces, and every piece become an independent whole, so Cuvier compares the nervous system to a net, or a broken loadstone, which originally was composed of homogeneous parts; and he proceeds to say that he thinks the different functions of the nerves must be attributed to external apparatus, to the ramifications and combinations of blood-vessels; in short, to an infinity of secondary circumstances, rather than to the internal structure of the nerves. It may, however, be proved anatomically and physiologically, that not the external apparatus only, but also the internal structure of nerves performing dissimilar offices is different. I admit five sorts of nerves, and subdivisions of each: the first of these presides over vegetative life; the second over voluntary motion; the third over the functions of

the five senses; the fourth over the feelings; and the fifth over the intellectual faculties. The nerves of the first kind are soft, and of a gray or whitish-red colour; those of the second are white and firm. The nerves of the five external senses differ universally in their consistence, colour, form, and texture. The fibres of the brain and cerebellum are white and delicate. Moreover, every nerve, and even the different parts of each, have their origins in a particular quantity of cineritious substance. Now, these anatomical circumstances never vary, and must consequently be essential to the structure and function of the nerves. Cuvier is therefore in contradiction with himself, when he says*, that "whatever be the position of the parts, and however circuitous the courses nerves must take to arrive at their destinations, certain parts constantly receive their nerves from the same source. Similar nerves have always a similar distribution. The smallest pairs, as the fourth and sixth, which might easily have been supplied by some neighbouring trunk, are regularly formed and destined†."—From these anatomical facts, it seems natural to conclude that the nerves are not all exactly alike; their difference, however, is equally proved by physiology. The divers functions of vegetative life, as the secretion of bile, saliva, tears, &c., suppose organs essentially different: is it not then likely to be the same with the nerves of the five senses? Their external apparatuses are said to be different, because fitted to receive different impressions; but can dissimilar impressions be transmitted to the brain by the same nerves? Could impressions of light be propagated by the auditory nerve? If the manner of propagating impressions from without, and of communicating these to the brain were essentially the same, and weaker or stronger only, perceptions of these similar impressions ought also to be essentially similar, and to differ in nothing but in

* *Loc. cit.* p. 192.

† J. Hunter made the same observation before Cuvier.

strength. This proves that the difference of the propagated impressions requires a corresponding difference in the structure of the nerves which propagate them. Moreover, the internal structure of the nerves must be different, because they perform their special functions aroused by mere internal irritations. The sensations experienced in dreaming are the same as external impressions produce. A person who has lost his eyes dreams that he sees; another thinks he feels pain in an amputated limb; an increased flow of blood to the eyes makes us see sparks and luminous bodies; to the ears, it excites tingling and humming noises. Finally, illusions of the five external senses, in different diseases, are produced by purely internal causes. All these phenomena force us to infer that the organization of every nerve is particular.

It is replied that the difference of the organs cannot be demonstrated. I answer that the contrary also cannot be shown. Hence, neither the homogeneous nor the dissimilar structure of the organs is proved or refuted by any consideration on the five senses. There are, however, many things similar in appearance, and really different in nature. Many fluids look like water, without being aqueous. Who can distinguish all the varieties of apple-trees by the difference of their ligneous fibres? and these must, nevertheless, be different, since their flowers and fruits are so. Hence, physiological must supply what is deficient in anatomical proofs.

VI.

Plattner has made what follows an objection: a musician plays with his fingers on all instruments, why should not the soul manifest all its operations by means of the same organ? This observation is rather in favour of, than in opposition to, the plurality of the organs, for there are ten fingers which play, and musical instruments have many chords or holes.

VII.

All voluntary motion is produced by muscles: it is, consequently, possible that all ideas and sensations may be the result of different motions of the cerebral fibres. Those who make this objection forget that the various motions are performed by many different muscles. There are flexors, extensors, pronators, &c., and every muscle is composed of many fibres, often having different directions. Now, in every position, and in every motion of the body, other and different muscles start into activity. In the same way we conceive every kind of sensation or idea attached to a particular organ.

SECTION V.

On the Means of Determining the Functions of the Cerebral Parts.

After having proved that the faculties of the mind are different, and that the manifestation of every fundamental power depends on some particular organ, it is natural to examine how the organ of each may be determined. As the idea of the plurality of the organs is very ancient, let us first consider what means have been employed for their detection,—enquire into the cause of the indifferent success that has attended those investigations, and afterwards speak of the manner pursued by Dr. Gall and myself.

I. *Anatomy.*

Many natural philosophers have hoped to ascertain the functions of the cerebral parts by anatomy, especially by comparative anatomy. It is even pretty generally believed that our physiology of the brain is the result of anatomical investigation. This, however, is not the case. I shall here make some reflections on anatomy in general, and on comparative anatomy in particular. There are very few instances where structure indicates function. Who, before observing the muscles in action, could have inferred from their structure that they were contractile? Who, from the anatomy of the stomach, could predicate its digestive power? Who, from the structure of the viscera, could decide that the liver would secrete bile, the kidney urine? The structure of the heart was known long before its function. Who, from the structure and form of the nerves, could determine what kind of impressions they propagate? The deepest penetration could not have assigned smell to the pituitary membrane of the nose,—taste to the nervous

papillæ of the tongue,—perception of light to the optic nerve, &c., from mere examination of structure.

It is the same with the brain. Though the direction of its fibres, their greater or less consistence, their deeper or lighter shades of colour, their size, length, &c., be known, what conclusion as to the functions can thence be drawn? None. It is with the brain as with plants, whose functions are extremely different even when differences in the organization are imperceptible, which however must exist, as effects proclaim. It is quite certain, therefore, that anatomical knowledge does not indicate function; some other means must consequently be used to discover the offices of the cerebral parts. Physiology has indeed often preceded anatomy. It was generally known that we see by means of the eyes, before their structure was discovered. If it were possible to determine functions according to structure, we should not have to refute so many errors; to show, for instance, that the feelings neither result from the viscera nor nervous plexuses and ganglia of the abdomen, nor from the temperaments, &c. Many cerebral organs were discovered by Dr. Gall, before their anatomy was demonstrated, and his discoveries might have subsisted for centuries without any information on the structure of the brain.

When I say, however, that function is not discovered by knowledge of anatomical structure, I am far from maintaining that the structure of a part has no relation to its function. The structure of the heart did not proclaim, yet it was in relation to, its function. It is the same with all the parts of vegetative and animal life. A physiological system of the brain would be necessarily false, were it in contradiction with its anatomical structure. If an anatomist could prove all nerves to be only prolongations of the brain,—show their termination in one central point,—demonstrate the absence of difference in the brains of animals with dissimilar faculties, and between the brain of an idiot from birth and that of a person endowed with great talent: in short, if an anatomist demonstrate the

structure of the brain to be in contradiction to our physiological principles, or *vice versâ*, he will annihilate our whole doctrine with all its consequences. There is then some relation between the structure and function of organic parts, but the structure of a part seldom if ever indicates its function.

Let us now examine whether by comparative anatomy the functions of the brain can be determined. At first sight comparative anatomy seems capable of affording important results, but a nearer view shows obstacles that preclude even the hope of aid from it. First, as I have just said, it is impossible to determine functions from structure. Then, there are animals whose vegetative life presents organs of which man is destitute. May we not conjecture that it is the same with animal life? but how can we conceive any function if we are not endowed with one similar? Accordingly, although it be of the highest importance to know what gradations nature observes in adding to and complicating the brains of animals as their functions are multiplied and ennobled, we must allow that, notwithstanding the most assiduous labours, comparative anatomists have only shown the mechanical forms of different brains, without determining the functions of the cerebral parts.

Principles were wanting to enable anatomists to determine the existence or absence of the same parts in different animals; these have been denied or admitted, according to similarity or dissimilarity of form alone. Anatomists do not even agree in what the brain consists. I call brain the nervous mass joined with the nerves of motion and of the five external senses, and manifesting the feelings and intellectual faculties.

In the lower animals it is extremely difficult, if not impossible, to determine whether there be a particular cerebral mass intimately united to the origins of the nerves so as apparently to form a whole, the parts of which cannot be demonstrated; or whether this mass belongs entirely to the nerves of the five external senses, in which case external impressions would be perceived without a brain, according to the definition just

given. In fishes, the nervous mass situated in the skull is divided into several ganglia, whose functions are not sufficiently understood. In birds the hemispheres of the brain are more considerable than in animals of a lower order; but they are without convolutions. We have rectified the error committed by the anatomists who stated birds to be destitute of commissures, thalami, and corpora striata. The cerebellum of birds consists of semicircular rings. In viviparous animals its lateral parts become very considerable. The brains of small quadrupeds, as of mice, rats, squirrels, &c., are smooth on the surface and without convolutions. Cuvier, however, is wrong in saying that the brains of the rodentia generally have no convolutions; for in the beaver they are very distinct. In the greater number of quadrupeds, the brain presents distinct convolutions; but the function of no cerebral part has ever been detected in them. According to Cuvier, all the mammalia, saving man and some of the simiæ, are without posterior cerebral lobes. He founds this assertion on the circumstance of their cerebella being uncovered with brain. The conclusion is, however, very incorrect; for the fact exists only in consequence of the horizontal position of quadrupeds. The presence of posterior lobes cannot be denied because their size and form differ in different animals, or else the anterior and middle lobes ought also to be denied. Nay, it seems to me that in animals the anterior and lateral cerebral convolutions are proportionately much smaller than those behind; for the pretended optic thalami, out of which the convolutions placed posteriorly spring, are proportionally much larger in quadrupeds than the external half of the corpora striata, from which those in the front and sides arise. Thus the anterior and middle lobes of the brains of animals do not present a greater analogy to those of man than the posterior lobes. It is generally to be observed that the position and form of cerebral parts do not constitute essential proofs of their existence. In man the ganglion of the olfactory nerve is covered by the anterior lobe

of the brain; in quadrupeds, it lies before it entirely: the olfactory nerve of man is separated from his brain; in the greatest number of quadrupeds it is united to the anterior convolutions, &c.; but are the anterior lobes therefore wanting in quadrupeds? Moreover, the cerebellum of all men is not entirely covered by the posterior lobes; these lobes nevertheless exist, and are only smaller in proportion to the cerebellum than in ordinary cases. Finally, animals manifest the functions which are performed by the posterior lobes of the human brain, and, consequently, we must conclude physiologically that the respective organs exist.

Cuvier, in contradiction with himself, states further that the brains of quadrupeds have the same parts as the brain of man. By this, however, he can only mean such large portions as the cerebellum, the pons Varoli, the thalami, corpora striata, corpus callosum, anterior and middle lobes. This assertion therefore still requires rectification in another respect. The brain and cerebellum of man and animals preserve the same general type, indeed, but they present many modifications, and many parts of the human brain are not found in the brains of animals. This point may be illustrated by analogy. All plants and trees have certain common parts, as roots, stalk, trunk, boughs, branches, and leaves; but can we say that all vegetables have the same parts? The general type is alike in all, but modifications are infinite. The laws of vegetation are similar in all plants, but the elements submitted to these laws are different. Precisely so are the laws of the nervous system; there exists one type from the brain of the insect to that of man, but it presents as many modifications as nature intended to produce different functions; the common parts are consequently more or less complicated.

Cuvier thought there was some relation between the tubercula quadrigemina and the nature of the food of animals. According to him, the anterior pair of these tubercles is larger in herbivorous animals, and the posterior in carnivorous. The

wolf and sheep however have the nates larger than the testes: the general assertion of Cuvier, therefore, falls to the ground. I pass over many other errors believed and propagated by comparative anatomists, because they belong rather to anatomy than to physiology; and I only say that comparative anatomy has no more than anatomy in general advanced the physiology of the brain. I think it will suffice if I quote but one passage of Cuvier in confirmation, where he says* positively that the instinct is indicated by no visible mark in the conformation of the animal.

II. *Mutilations.*

Several natural philosophers have endeavoured, by mutilations, to determine the functions of the brain. They cut away various parts to see what faculty would be lost. But, in the first place, such means formerly could not be accurately employed, and must therefore have been entirely useless; the duplicity of the organs was frequently overlooked; the structure of the brain too was not known, and the mutilations were made horizontally, while the direction of the fibres is vertical. Moreover, the special faculties of the mind were unknown, and the mutilated animals were said to manifest all the faculties, if they exhibited such as are common and general only.

These means have been pursued without fruit hitherto, and are certainly inadequate to determine the functions of the brain; for the organs not being confined to the surface must be cut away on both sides down to the medulla oblongata, and a wound of this extent would kill any perfect animal. But let us even suppose that it survived such a mutilation, how is it to manifest a sensation of whose organ it has been deprived? and how indicate its want? Such operations too are so violent that several faculties might be retained without being mani-

* Le règne animal distribué d'après son organization. Paris, 1817, tom. I. p. 54.

fested. A bird whose brain is half scooped out is not likely to sing, or to build a nest, &c. Finally, parts deranged by sympathy are sometimes more sensible than those which suffer primitively or idiopathically. A headache often results from something indigestible in the stomach, and this without any feeling of pain in the stomach itself.

Several French physiologists, particularly M. Flourens and M. Magendie, have recently mutilated the brains of various living animals; from their observations the inference might be drawn that the whole brain and cerebellum are solely destined to regulate voluntary motion. This, however, is in contradiction with all physiological observations on the brain in the healthy state. I think that it is impossible to determine the functions of the cerebral parts by mutilation.

III. *Sir Everard Home's Method.*

Sir Everard Home*, in his observations on the functions of the brain, read to the Royal Society on the 26th of May, 1814, seems to trust to a peculiar means of determining the functions of the cerebral parts. He says: "The various attempts which have been made to procure accurate information respecting the functions that belong to individual portions of the human brain having been attended with very little success, it has occurred to me that, were anatomical surgeons to collect in one view all the appearances they had met with in cases of injury to that organ, and the effects that such injuries produced upon its functions, a body of evidence might be formed that would materially advance this highly important investigation." He then informs his readers that he has brought together certain observations, stating them as so many experiments upon the brain, with the conclusions which tend to elucidate this particular enquiry.

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* Phil. Transactions for the year 1814. Part II. p. 769.

Let us first hear his observations. We read* "that in the torpid state, commonly attendant upon any violent shake being given to the brain, the senses are so much impaired that little information can be gained respecting the effects produced upon the internal organs;—that a *coup de soleil* is sometimes accompanied by delirium, loss of speech, and the power of swallowing;—that blood extravasated in the lateral and third ventricles was attended by repeated fits of vomiting and by coma; that coagulable lymph, spread over the union of the optic nerves, the pineal gland, and tuberculum annulare, was followed by permanent contraction of the muscles between the occiput and vertebræ of the neck, dilatation of the pupils, and a great degree of deafness;—that the formation of pus under the dura mater covering the right hemisphere was accompanied by delirium succeeded by coma;—that a tumour in the substance of the posterior lobe of the brain was attended with derangement of the functions of the stomach and bowels, and with double vision;—and that a deep wound in the right anterior lobe of the brain, attended with inflammation and suppuration, produced no effect whatever, the senses remaining entire, and the person not knowing that the head was injured. In a case also in which the tuberculum annulare had become so hard as not to be cut easily with a knife, a considerable quantity of earthy particles having been intermixed with the medullary substance of the crura and other parts of the cerebellum, and the cerebrum and the upper parts of the cerebellum being unusually soft, the effects were that the boy had been an idiot from birth, never walked, spoke, nor understood what was said, often went three days without food, and so on."

I suppose Sir E. Home did not intend to state such facts as quite new and unobserved; for every one who is but half acquainted with the history of the healthy and diseased state of the brain knows that many authors have related cases, in most

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* Sect. II., p. 477, &c.

or in all respects similar. We learn, however, from his paper, that like grave affections of the brain often produce no perceptible derangement in the manifestations of the mind. I only maintain that the means Sir E. Home has adopted are quite inadequate to point out the functions of the brain, and that all hope of success from such a procedure is vain; this, my opinion, is supported by the observations of Sir E. Home himself. He does, indeed, speak of a body of evidence which might be formed, and of conclusions which tend to elucidate this peculiar enquiry; but he has not drawn even one inference. In the various pathological affections of the brain, he has observed headache, giddiness, faintness, loss of memory, want of sleep, delirium, mania, depression of spirits, melancholy, apoplexy, idiotism, hissing noise in the ear, deafness, blindness, loss of speech, irregular pulse, stupor, the mouth drawn to one side, numbness of the arms and legs, spasms in the lower extremity, stumbling in walking, pain between the shoulders, nausea, retching, slow action of purgative medicines, vomiting, convulsions, &c. Perhaps Sir E. Home will be inclined to infer that the brain is the organ of these symptoms, or may it be of the states which are opposite to them? The above will be sufficient to show an intelligent reader that in Sir E. Home's mode we shall never be able to determine the peculiar functions of the cerebral parts.

IV. *Dr. Gall's proceeding.*

Dr. Gall's researches in the beginning were merely physiognomical. He compared the size and form of the whole head with the general faculties of the understanding, looked for particular signs only of memory, judgment, and imagination, and did not at first suppose that the feelings also resided in the brain. Not succeeding in this way, he compared the form and the size of the whole head with the favourite occupations of those who were remarkable for peculiar talents. He thought,

for instance, that great mechanicians may be distinguished by a face capable of being enclosed between two parallel lines—in other words, which was equally wide at the temples as at the cheek bones, and great musicians by a triangular form of the forehead. He met, however, with exceptions, and was then admonished that he had not yet arrived at the truth ; for nature makes no exceptions in her laws. If the eye be the organ of sight, vision can never exist without the eye ; so also in regard to the internal organs. If a peculiar faculty be attached to a certain cerebral part, this can never be wanting if the faculty is manifested. This truth is as evident as the statement that no effect can take place without a cause. Dr. Gall was therefore obliged to give up his early method of investigating general configurations of head, in which he had spent several years. This time however was not entirely lost, as he acquired great facility of distinguishing the slightest differences in configuration.

Recalling to his mind his first observations, by which he distinguished a good memory from the developement of a particular part of the brain, which, projecting into the socket, gave to the eye a prominent appearance, he then sought to discover the organs of particular faculties, and compared peculiar cerebral configurations with the natural vocations of different persons. Thus, when he observed any mechanician, musician, sculptor, draughtsman, or mathematician eminently gifted, and who had displayed his talent from birth, he examined his head, to see if he could discover a peculiar developement of any cerebral part. Proceeding in this way, he soon detected peculiar developements in musicians and mechanicians. He observed that a certain organ was always highly developed when a peculiar talent was innate, while the rest of the head was very differently shaped in each individual case. At first he confined his observations to men of partial genius ; and such individuals were indeed his best subjects, not only because their organs are easily pointed out, but also because they alone resist, or are

superior to the influence of external circumstances and education. These individuals are also the most proper for confirming the organs and convincing beginners; for in them the organs are most easily distinguished, and the relation between developement of cerebral parts and particular manifestations of mind is most evident. It is also important to observe the characters of persons who, being uncultivated, are least capable of dissimulation. As physician to the establishment of the deaf and dumb at Vienna, Dr. Gall was fortunately circumstanced for this purpose. Here he could observe the natural state of mental manifestations, and detect different degrees of susceptibility of education. With this view persons from the lower classes were also called into his house, and encouraged in such conversation and behaviour as might develop their characters.

Thus Dr. Gall, to discover the mental faculties and their particular organs, had recourse to the principal actions of men, and then named the cerebral parts accompanying after these actions. Individuals are born mathematicians, mechanicians, musicians, philologists, metaphysicians, poets, &c.; if he found a certain part of the brain of each uniformly more developed than the rest, he termed this the organ of mathematics, music, philology, metaphysics, or poetry, &c. In the same way individuals are, from birth, stubborn, proud, courageous, or thievishly, murderously, religiously inclined, &c., and the cerebral part that regularly accompanied these actions he called organs of pride, firmness, courage, theft, murder, religion, &c. Being unacquainted with the special faculties, he could proceed in no other way, and he erred only in not suspending the domination of the organs. He observed man in action only; but as actions seldom result from one single faculty, and as they often proceed from abuses of the faculties, the nomenclature assumed by Dr. Gall was necessarily very defective. It is true that individuals who, for instance, have stolen from infancy, notwithstanding the most careful

education and the severest punishment, have one portion of the brain particularly developed; but all persons in whom the same part is large are not thieves. It is the same with the organ of murder: those who, from infancy, have shown a propensity to kill and destroy, have a part of the brain highly developed, but all who have it thus large have not necessarily murdered.

It is indeed evident that no organ should be named after the abuse of its function. Gluttony and drunkenness depend on some organic cause, but we do not speak of the organs of drunkenness and gluttony. The abuses of physical love depend on a certain organization, but no one speaks of an organ of such abuses. I shall afterwards show the names of theft and of murder perfectly inadmissible also. These acts are abuses resulting from high activity of certain organs, not directed by other faculties. Dr. Gall, who discovered the particular organs only when extremely developed, while the others around them were small, observed a certain organization in inveterate thieves—a regular and constant fact; but he erred, as already mentioned, in naming the organ from its abuse. Moreover, he observed the particular actions only which accompany different organs, and seldom determined their special functions. Hence, in discoursing of every organ, he complains that he does not know its sphere of activity. His mode of observing, however, was necessary as a commencement, and has prepared the way for several philosophical considerations, which elucidate phrenology, and show it conformable to all other physical and moral truths.

Let me now take a view of the particular application of the means adequate to determine the organs of the mental faculties. Dr. Gall, observing that greater than common developement of a certain cerebral part corresponded with a peculiar talent or determinate inclination, supposed the part so developed might be the organ of such manifestation, and the probability of this assumption increased in proportion to the number of confirmatory observations. Again, if he saw a

head with a protuberance, evidently occasioned by the developement of a cerebral part, he endeavoured to get acquainted with the individual, and to learn his talents or dominant character. If the organ was one on whose functions preceding actions had already led him to draw conclusions, every new case of correspondence increased the probability of his having been correct. If, on the other hand, it was an organ not yet observed, he compared the actions or inclinations which accompanied it with its developement and the mental frame of others, and concluded accordingly. In these two ways, all the organs Dr. Gall discovered were determined. These were, to give them his own titles, the organs of propagation, murder, theft, mechanical arts, music, mathematics, and metaphysics, discovered by comparing the larger developement of individual parts with energetic actions, and the organs of love of offspring, circumspection, aud religion, by looking for the determinate actions that accompany great developement of particular organs.

Now, if energetic functions indicate large organs, and if large organs produce energetic functions, weak actions will indicate small organs, and small organs will produce weak actions. Dr. Gall, consequently, compared weak mental functions of individuals with the respective cerebral organs, and small organs with the respective functions; and if weak functions corresponded to small organs, or small organs to weak functions, his first conclusions were confirmed in a negative way.

Many circumstances contributed, from the beginning, to favour the multiplication of these positive and negative proofs. Dr. Gall, living in a great city, professionally acquainted with many families, and physician to the director of the schools at Vienna, had many facilities afforded him of observing character in all situations and at all ages. Without children himself, he could spend his income on his favourite pursuits; he was also bold enough to address every person in whose head he observed any peculiar configuration. In our travels together we likewise had great opportunity of observing, and

gained much information; and, as we met with many distinguished persons, we constantly compared their organization with their capacities. In short, we collected innumerable facts by visits to establishments for education, to hospitals for idiots and the insane, to houses of correction and to prisons, by our intercourse with different nations, and our free communication with all classes of society.

It is known that physical science in general improves in proportion as experiments or observations that relate to it are repeated. We therefore continue to multiply facts; and, as their number in favour of several organs is immense, we consider them as established, and we must be permitted to insist upon the correctness of our conclusions, so long as no contrary observations prove that we have erred. Several organs, however, are still only probable; these consequently require more numerous observations before being regarded as completely established.

It is objected that the organs cannot be verified, because our conclusions are drawn only from individual facts. But this is the case with every physical truth. No physician has observed every fact; no anatomist has seen the viscera of every human being. Yet reliance on the stability of natural laws bids us admit all physical truths, and infer the structure and position of the viscera to be the same in individuals who have not been opened as in those who have. It has also been said that our observations might be true in one country and not in another. Our travels have refuted this objection.

Dr. Gall, at a very early stage of his progress, began to make a collection of casts from the heads of individuals remarkable for qualities, whether talents or moral sentiments. He thus preserved memorials of his observations, which he could often rectify by comparisons and examinations of them in private, and at different times,—a very important point; for our mind is not always equally energetic and acute. He often placed the busts of individuals who excelled in the same func-

tions together, without distinguishing any similarity in the shape of their heads; sometimes he looked in vain at them for several weeks. Those only who have engaged in such studies know how long the eyes must be exercised before they can detect every difference in forms and sizes at a glance. The collection of busts had still another advantage. Many of the individuals were remarkable in several points of view, as well affirmatively as negatively, and consequently presented various points for comparison.

At the same time he collected skulls, especially of those who were remarkable for particular qualities, and, if possible, of those whose busts he had modelled in plaster. He thus learned to compare heads with individual skulls, and also to perceive more clearly the forms of the organs.

As the arrangement and position of all common parts are nearly the same, it is very useful to compare the cerebral organization of animals endowed with like powers, or to contrast this with that of such as are destitute of these faculties. In this way points of comparison are exceedingly multiplied, and observations, relative to faculties common to man and animals, may be repeated to infinity. The function of no organ, however, has been discovered in animals; all were pointed out in man; and certainty can only be attained by confining observations to individuals of the same kind, and above all to individuals of great talent or very marked character. Some facts, in the comparative physiology of the brain, have been pointed out by agriculturists, horse-jockeys and others, in different individuals of the same species. Peasants find that horses with large foreheads are more docile than those with small, and therefore put them at the head of the team. Jockeys distinguish biting and stubborn horses by the configuration of the forehead. These observations, however, on the different forms of the head with their consequences, were made without their causes being enquired into, which really consist in the greater or smaller developement of

peculiar cerebral parts. The comparative anatomy and physiology of the brain then may contribute greatly to determine the organs. Many animals are mutilated, so to speak, by nature; and it is not necessary to effect this by means of the scalpel, to determine the functions of the cerebral organs. In fact, comparative anatomy shows that in the lowest animals the brain is very simple, and in the more perfect more complex; in conformity with this truth, it is observed that the faculties are multiplied as the cerebral parts become more numerous.

The anatomy of the brain, in particular, confirms us in establishing the organs. First, the bundles which constitute them are distinct, and their plurality consequently is as evident as the plurality of the faculties. Moreover, some faculties are very potent and have a great sphere of activity, while others are very weak; the size of the respective organs harmonizes with this fact. It is known, for instance, that the feelings act with greater energy than the intellectual faculties, and anatomy exhibits a corresponding difference in the quantity of apparatus apportioned to each sort of function. Anatomy also shows that the various cerebral parts are not simultaneously developed, exactly as the manifestations of the mind start not at the same period into action. In short, the structure of the brain, as of every other part, harmonizes with its function.

The diseases and injuries of the brain may also be made a means of determining the functions of its individual parts; but I have already observed that it is at least a very uncertain one, therefore secondary and indecisive, though interesting when combined with others more direct. In treating of the particular organs, I shall make use of arguments drawn from this source, without, however, maintaining that it is possible to point out peculiar offices solely by its aid. Mental alienations, and especially partial insanities, monomaniæ, and the state of idiotcy, are much more available than accidental injuries of the brain. In idiots from birth the brain is either small or

distended by water. In partial insanities, the organs whose functions are most deranged are commonly more developed than the rest; whoever manifests a certain sentiment or intellectual faculty with peculiar energy will, in a state of great excitement, exhibit this faculty predominantly. I never saw one insane from pride without great developement of the organ of self-esteem. It seems to me, however, that very great developement of a particular organ is not indispensably necessary to impress its peculiar character upon every partial insanity; for any part of the body in general, and of the brain in particular, may grow more irritable than the rest; the energy, therefore, of each cerebral organ may increase, and produce partial insanity.

The heads of different nations offer a study of great importance. Several anatomists and physiologists have endeavoured to point out and to fix particular national forms of head. Their observations though very defective, are still rather in favour of than in opposition to our physiology of the brain. The foreheads of negroes are narrow, and their musical and mathematical talents are, in general, very limited. The Chinese are fond of colours, and have the eyebrows much vaulted. According to Blumenbach, the heads of the Kalmucks are depressed from above, but very large laterally, about the organ which gives the inclination to acquire, and this nation's propensity to steal, &c., is admitted. In like manner, the modes of thinking and feeling of different nations may be compared with the state of their peculiar cerebral organs, indicated by peculiarity of cranial configuration. It is obvious that here I only speak of the greater number of individuals in every nation, and the general type of their heads; for the modifications are in all countries infinite; generally speaking, however, there are nations whose heads are longer or shorter, higher or lower, narrower or broader, &c. Many valuable observations might be made by those who visit distant countries. Let us hope that they will pay at least as much attention to the study of man as to that of

animals and plants, as soon as they are convinced of the influence exercised by the brain on the manifestations of the mind.

There is still another means of pointing out or of confirming the organs: pathognomy, mimicry, or the natural language. Every internal sentiment is proclaimed outwardly by certain motions of the head, body or limbs, and such external manifestations are the constant and inevitable results of activity of the internal faculties. They are also essentially the same in all nations and at all times. I do not here intend to enter on the principles of the doctrine of external signs indicating internal activity: this belongs to the practical part of anthropology, and I shall treat of it separately. I here mention only one principle having relation to the seat of the organs: the motions are always conformable to the position of each. If for instance an organ situated in the posterior part of the brain be active, the general motions will be backward; and if in the forehead, they will be forward, &c.

By all these means continually employed to multiply observations, the function of every organ may be determined, or the organ of every mental faculty discovered. The number of facts already collected is immense, and it is quite impossible to quote the whole. I can only speak of results, or general deductions from them. Moreover, no one can arrive at personal or individual conviction without having made similar observations. Dr. Gall admonishes his auditors not to attempt practising Phrenology, on account of its difficulty; I on the contrary invite every inquirer to repeat the observations in order to obtain self-conviction. Yet every one should consider it a duty to be well acquainted with Phrenology, before making any application of it. It is true that it requires examination, and I can only show what is to be observed and how it is to be done; but I shall advance nothing that may not be seen and appreciated by every other person. I do not listen to objections grounded upon reasoning alone,

and without all observation as a basis; one fact is to me more positive and decisive than a thousand metaphysical opinions. I, with Mr. Abernethy*, think that when "books of this kind are published, mutual forbearance is requisite on the part both of the writer and the reader. The former should not expect his work to be approved of, till the latter has examined whether his representation is correct, and his conclusion slegitimately drawn from the facts he has observed and collected. Neither should the reader condemn the work till he has examined the subject, and is in consequence able to point out the errors of the premises or conclusions. The author's view of a subject may, indeed, be correctly formed from the facts which he himself has witnessed, but it may differ from that which more extensive experience would have suggested. For this difference no blame can properly be attached to him; he relates what has fallen under his own observation, and invites others to attend to the same facts." We accordingly flatter ourselves that every one who, without prejudice, may take the trouble to examine and to repeat our observations, will be convinced of the solidity of our principles of the physiology of the brain.

From the preceding considerations it follows, that the size of the cerebral parts is compared with very energetic actions, and with determinate characters, in order to discover their functions as the organs of the mind. All functions, however, differ not only in quality but also in quantity, and there are, undoubtedly, several organic conditions which contribute to bestow energy and to modify them individually. The size of the organs is only the most easily observed condition. The reader must therefore remember that, in endeavouring to discover the organs of the mind, in other words, to determine the nature of the functions of the cerebral masses, their size suffices.

* Surgical Observations on Local Diseases. London, 1809. Pref. p. vii.

The organic constitution, or the temperament of the cerebral organs, is another very important condition to their natural energy, and Dr. Gall and I attend to it also as much as possible; but it is more difficult to observe modifications here, than in size and configuration. They are therefore mistaken who object that we neglect the organic constitution of the cerebral parts, since it is in fact a leading point with us, that every fundamental faculty must be compared with its appropriate organ, not in individuals of different kinds, not even in different individuals of the same species, but in the same individual. If we examine the different degrees of activity of the cerebral organs, it is necessary to consider not only their size and organic constitution, but also the exercise every faculty has undergone, and the mutual influence of the whole. These considerations, however, do not come within the sphere of physiology, but belong to the practical part of phrenology.

It is not generally admitted that the natural energy of the mental functions is in proportion to the size and organic constitution of the cerebral organs. We have merely to answer, that experience favours our proposition. It may even be shown that the law under which inorganic and organic bodies manifest their properties in proportion to their size, is quite general and pervades nature. A large loadstone attracts a greater mass of iron than a small one. The fermentation of liquids is more energetic as their quantity is considerable. Large muscles *(cæteris paribus)* are stronger than small. If the nerves of the external senses be larger on one side of the body than on the other, the functions are also stronger on that side. Why should not the same law hold good in regard to the cerebral organs? Nevertheless, by reason of internal constitution, we confine our observations entirely to individuals in obtaining the first notions of any organ. I even admit the possibility of the internal constitution of the different cerebral organs varying in the same individual, just as the optic nerve may be more irritable than the auditory or the olfactory; yet it is quite certain

that great difference in the size of the cerebral parts produces a difference in the manifestations of the respective powers. Indeed, the divers parts of the brain are differently developed: one is large, another small, and experience has convinced us that the functions of parts much developed, are manifested with more energy than those of others which are comparatively smaller.

The question, whether it is possible, during life, to distinguish the developement of the cerebral parts in man and animals immediately presents itself here. This question, however, must be separated from another, viz., what is the cause of the form and size of the head? This latter is important to general physiology, but its investigation forms no essential part of practical phrenology, which only requires certainty on the possibility of knowing the size of the cerebral parts, without being held to examine the causes of their developement. To the first question we must reply differently in regard to different kinds of animals; it is not always possible to compare one animal with another, or animals with man. It is also necessary, in animals and in man, to consider the period of life. In the human kind it is at one time easy to determine the size of the cerebral organs; sometimes, however, circumstances render it difficult; and, finally, in certain cases, it is impossible.

Considerations in relation to these points constitute, strictly speaking, the doctrine of the skull, or *craniology;* but this name by no means designates the whole of our inquiries, and can be used only by those who wish to depreciate them.

SECTION VI.

Craniology.

I subdivide the doctrine of the skull, or craniology, into two chapters. In the first I examine the cause of the form and size of the head; and, in the second, the possibility of determining the size of the cerebral organs. Here I speak only of the human kind, but these researches may be extended to every species of animal.

CHAPTER I.

Cause of the form and size of the Head.

Whether does the skull or the brain determine the form of the head is a common question. In its illustration, I shall consider man both in a state of health and afflicted with disease. The brain of the fœtus in utero exists, before it is surrounded by a bony case; it is covered with a fourfold membraneous coat: the pia mater, which adheres closely to its substance; the tunica arachnoides or arachnoid coat, which has this name from the extreme tenuity of its texture; the dura mater, which consists of two separable layers; and a cartilaginous membrane, in which ossification takes place. This fourfold membraneous coat envelops the brain, and represents its external form exactly.

Ossification commences at different places or points, and extends from these in radii to the extent required by the size and form of the cerebral parts which are to be included. The bony radiations meet nearer or more distantly from the

points whence they sprung, and constitute the individual bones, of which the regular and connected assemblage forms the skull. At birth, there are commonly eight bones; viz., two frontal, which, for the most part, soon unite and form one; there are adults, however, whose frontal bone is divided; two parietal, two temporal, one sphenoidal, one occipital, and one ethmoidal. These, in after life, are connected by sutures or articulations, and then complete a bony case called skull. In new-born children, generally, the approaching angles of the frontal and parietal bones are not ossified, but membranous, and the space left between them is called fontanel. All the bones are at this time very thin and most perfectly accommodated to the form and size of the brain. It may here be asked, whether any difference as to the size and shape of brain be perceptible in the fœtus. Soemmerring has replied in the affirmative; Dr. Gall and I are also of the same opinion, and hold that the heads of fœtus are as indubitably different as those of grown-up persons.

Moreover, it may be demanded whether the form of the head is changed during the birth; and also whether it is possible for midwives to give it an arbitrary form by compression in any way. The head of the fœtus, when long detained in the passages in difficult labours, is often much compressed. Nature, however, has taken particular care of the brain, even under these circumstances; for the dura mater which envelops it adheres to the skull firmly, and prevents the edges of the bones ftom passing over each other. The prolongations of the dura mater, known under the names of falciform process and tentorium, contribute equally to its security; and further, the skull forms an arch, of all forms that which best resists opposing forces. The brain is also a living part, and is naturally elastic. The tumours commonly observed on the upper part of new-born children's heads, are mere accumulations of blood, the consequences of interrupted circulation; after a few hours or days this is absorbed, and the

swelling disappears entirely. Transient and not very violent pressure, therefore, does not change the primitive form of the brain. Excessive, it will undoubtedly derange its organization; and less violent but permanent, will alter its natural form, hinder its developement, and certainly injure the manifestations of the mind. If individuals whose brains are compressed do not become idiots, their faculties will at least be impaired.

It happens sometimes that the bones of the skull do not touch at birth, and then the brain is compressed during parturition, and the child dies. This fact should be known and considered when an unfortunate woman is accused of having murdered her offspring. It will be obvious that, though in ordinary cases great violence would be necessary to compress the brain, yet, in effecting delivery with the forceps, this may readily happen, and its texture be injured; in which event the manifestations of the mind would be injured also. These observations shew that, up to the period of birth, the form and size of the head depend on the brain.

From this epoch the skull gains hardness and solidity, and some may say, does the hard skull then yield to the soft brain? If we compare a child's with an adult's skull, that of the adult will be perceived to be much larger than that of the child; the skull consequently increases in capacity in proportion as the brain augments in volume. Moreover, all the cerebral parts do not arrive at their complete growth simultaneously; a similar law may be observed in regard to the developement of the skull. The forehead, for instance, which at birth is narrow and flat, widens and grows more prominent from the age of three months till that of eight or ten years; afterwards, its middle part does not appear so much developed as it had in early infancy. Children's necks are very small; for the cerebellum which increases at a very late period, is situated in the inferior occipital fossæ; in proportion as it grows, however, the skull projects externally. This law is quite general.

Some explain the growth of the skull by supposing the brain to act in a mechanical way. This idea is incorrect. Were the brain exposed to the least compression, its functions would be deranged. The phenomenon of growth, in fact, results from the changes which every organic body unceasingly undergoes. There is a perpetual process of decomposition and reproduction going on in living beings; the matter which constitutes our body, continually evacuated by excretion, is replaced by new matter furnished by alimentation. Like all other parts of our body, the brain and skull are subjected to this process; and, according to the natural law of relation established between the skull and brain, the brain commands at all ages the directions in which bony matter is to be deposited to form the skull. If the whole of the brain or some part increase or decrease, the ossification still follows the size and form assumed. Hard parts, indeed, are generally adapted to the size and form of the soft ones they enclose. In consumption, if one side of the lungs alone be affected, the ribs of that side sink down. If the eye be extirpated, the orbit becomes smaller; and if, on the contrary, it grow carcinomatous, the orbit enlarges as the eye-ball increases in size. Precisely so does the skull follow the brain in its size and general configuration.

Let us now cast an eye on the changes produced by old age on the brain and skull. The cerebral parts begin to diminish; the convolutions which in youth were plump and well nourished, are flaccid, shrivelled, and no longer packed closely together. In proportion as the brain or its parts decrease, they are followed by the internal table of the skull, in conformity with the law of nutrition, of which I have just spoken. Frequently the external table to the end of life preserves the form and size it had at the period of maturity; the skull, in consequence, either becomes very thick, or the two tables are far separated from each other. The orbitary plate of the frontal bone is commonly thin and trans-

parent, yet, in old persons, whose brain has diminished in size, it sometimes happens that the two tables of which it consists are separated; the inner having receded to a great distance from the outer. From these data it results that the form of the skull is the consequence of that of the brain; that from the commencement of ossification till death the internal table of the skull is moulded after the fashion of the brain; and that in extreme old age the two tables are often separated, and the bone thus rendered thicker than it was at the age of maturity.

Diseased or imperfect states of the brain also prove this position relative to the causes of the form of the skull. In those idiots from birth whose brains have never increased in size, the skull always remains small (*Pl.* i. *fig.* 1); on the contrary, if the head be distended by water, the skull participates in the expansion, either generally or in particular situations.—(*Pl.* ii. *fig.* 1 & 2.) Portions of bone depressed by external violence, are often replaced in their first levels by the action of the brain. Fungi of the dura mater also cause the absorption of the skull rather than of the brain, for they pierce it and appear externally. All, therefore, concurs to prove that the form and size of the brain regulate the form and size of the skull. I do not, however, deny that, in some diseases of the skull, the ossific process may be primitively altered, and the brain injured in consequence.

It is an error to suppose that the impressions which correspond to the cerebral convolutions, and the blood-vessels of the dura mater on the internal surface of the skull, are the result of mechanical pressure. These grooves are the effect of the absorbent vessels, and the impressions called digital occur when the dura mater is very thin. This in man and in the greater number of animals, is only at the basis; in individuals, however, who die of consumption, it is sometimes observed of peculiar delicacy and thinness over a much greater extent, and then the pits pervade almost the whole of the internal surface of the skull.

OBJECTIONS.

Several opinions relative to the size and form of the head are quoted as objections to the position, that in the healthy state the form of the head depends on that of the brain.

I.

Walter of Berlin, Rudolphi, and others, maintained that a nisus formativus, or formative power, determines the ossification and consequent shape of the skull.—The ossification of the skull is certainly not an effect of the presence of the brain; the bone is secreted by particular vessels, which have the power of modifying the internal constitution of the skull. The earthy particles are, nevertheless, deposited in a cartilaginous coat, having the form and size of the brain. Yet we must here allow that, when the brain is impeded in its developement, and water collected between it and the dura mater, the form of the skull is still similar to that which it would have presented had the brain been in a natural and healthy state, or been distended by water accumulated within its cavities. In treating of hydrocephalus, section III., p. 43, I have quoted several cases in which it was impossible to decide by external appearances where the water was accumulated. It seems to me, that the processes or prolongations of the dura mater, called tentorium and falciform process, contribute greatly to determine the form of the head in these cases.

II.

Hufeland remarked, that the form of the head might probably be changed in the countries where burdens are borne on the head. Now, in the first place, very young children bear none; and, before they begin to do so, their skulls are fully ossified and capable of great resistance. Secondly, those who bear burdens on the head, use cushions or rolls, so that pressure

is received, not on the top of the head nor on any one point, but diffused over a large surface, including even the lateral parts; consequently, the head cannot be flattened from such a cause. Moreover, the head is free from burdens during the greater part of life. Finally, this opinion is refuted not only in theory, but also by experience. Dr. Gall and I examined many individuals who had carried loads on their heads from youth up to mature years and old age, and whose heads were nevertheless much higher than those of others who had never borne any burden whatever.

III.

It is also objected that, in America, several tribes of savages give arbitrary forms to the heads of their children. I pretend not to say that such reports are false; I even admit that such instruments as we see preserved in museums as curiosities are used with the intention of flattening the head, but I am far from being satisfied that the effect attributed to them is a consequence of their employment. I have now seen ten skulls of Caribs; they were all low and laterally extended, particularly at the temporal bones; yet they presented as marked diversities as ten skulls of any European nation could do. I have also seen skulls of Europeans still lower. This form of skull, therefore, is not merely the effect of artificial pressure. Moreover, the upper surface of all the Caribbean skulls is variously vaulted, and bears, except in one, no marks of modelling from the pressure of a smooth and level board. It even seems to me, that the account of the Caribbean manner of flattening the head refutes itself. From our observations above, it is evident that great force would be requisite to compress the skull and brain; now this cannot be applied from above, without being balanced by an equal force from below, or from the back or sides; and if the pressure from above produce a given effect, the counter-pressure must produce the like. My opinion therefore is, that Americans as well as

Europeans who endeavour to give any arbitrary form to the brain, only make a vain attempt.

It may be replied, that the influence of pressure is evident in the feet of the Chinese women.—I certainly do not deny it in this instance; but then the members are compressed on all sides, there is pressure and counter-pressure, and the effects are visible over the whole extent of surface compressed. The same process might possibly be applied to the head; here I merely expose the incorrectness of those who tell us that the head is depressed on one aspect only. I have interrogated several gentlemen who had been in the island of St. Vincent, to gain information on the attempts of the Caribs to deform themselves. The accounts were all in contradiction to each other, and I am still in a state of complete uncertainty.

Several other considerations support my doubt of the configuration of the Caribbean skull being produced by art. Throughout Europe, the foreheads even of new-born children are higher and more prominent than those of adult Caribs. Caribs are therefore either born with foreheads as low as we see in the skulls, and their further developement is prevented by artificial pressure, or their foreheads are higher from birth, and are afterwards flattened or depressed by art. I have already shown that the latter opinion is improbable, and the former seems not better founded in observation. I have heard various statements as to the period during which the board is applied to the head:—one gentleman told me that it is worn for six weeks only; another assured me that it is borne six months; a third, that it is kept on during two years. Admitting the last period to be correct, I am not yet convinced of the reality of its pretended effect on the configuration of the forehead. At two years of age, the cerebral parts situated there have not acquired their full developement; the foreheads of Caribs, when arrived at maturity of years, must certainly be larger than when still in infancy. Now as the constituent particles of the brain and skull, as well as of the rest of the

body, are changed perpetually, and as pressure is not continued during after life, the future developement of the brain might go on unimpeded.

Notwithstanding these sceptical observations, I consider this a question of the highest importance; and I certainly do greatly wish that it were possible to prevent, by artificial pressure, the growth of certain parts of the brain. In instituting a series of experiments on the effects of pressure upon the configuration of the skull and the organization of the brain, it would be necessary to observe whether the developement of the cerebral parts was entirely impeded, or whether the compressed parts increased in another direction, so that the form alone was altered.

IV.

A great number of anatomists and physiologists maintain that the form of the head is modified by its muscles, and that several elevations ascribed to the developement of the subjacent brain are effects of muscular action. There are, indeed, many bony processes on the skull, but they are neither effects of cerebral developement nor of muscular action: these elevations are for the insertion of muscles. I here speak only of those forms and of those protuberances of the skull which I consider as corresponding to developement of brain.

Those who assert the influence of the muscles upon the form of the head, do not agree about their effects: some maintain that they depress the organs; others, that they produce elevations. It is easy, however, to prove that they have not the slightest influence on the form of the skull.

If the muscles really did determine the form of the skull, they ought obviously to act in the direction of their insertions; and the protuberances of the occiput and sides of the head ought then to be directed downwards, not backwards and sidewards. There ought also to be some proportion between the size of

these protuberances and the strength of the muscles inserted into them; but it often happens that large protuberances correspond to weak muscles, and *vice versâ.* Negroes, indeed, have larger masticating muscles than Europeans, and their heads are also narrower across the temporal region. From this fact some anatomists have concluded that the muscles compress the skull. At variance with this, however, we see that while the basilar region of the skull, covered with muscles, is narrower than the upper in children, it is quite the contrary in adults. Europeans who have very weak masticating muscles and wide heads, and others who have strong muscles and narrow heads, may be met with every day. Lions, tigers, hyænas, and dogs, are much narrower at the temples than oxen, horses, stags, &c.; the former, it is true, have stronger masticating muscles than the latter, but women have weaker muscles and narrower heads, whilst men have stronger muscles and wider skulls.

Moreover, according to the hypothesis which I am combating, the muscles ought to act upon the external table of the skull, and make it recede from the internal, yet the two are absolutely so near at the places where muscles are inserted, that the skull becomes transparent. It sometimes happens that the skull grows thick in old persons, or in consequence of chronic diseases of the brain, because the internal plate shrinking, diminishes the cavity of the skull, while the external one preserves its elevation and form.

The processes or depressions of the skull ought also to be not only proportionate to the strength of the muscles, but likewise to the time during which they have acted—circumstances which, however, are not observed. And were the protuberances or depressions produced by the muscles, they ought to be conformable to the forms of their insertion; but what muscle can produce the figure of the organs we have indicated, as of amativeness, destructiveness, constructive-

ness, &c.? The form of these protuberances, in fact, always corresponds to that of the cerebral parts, whose great developement occasions them.

Besides, there are many protuberances where no muscles are attached, as those which indicate firmness, veneration, benevolence, self-esteem, and circumspection. What muscle draws the skull outwards in the direction of those eminences? In many animals, as in the hog, or elephant, &c., the tables of the skull are far separated, but the cells formed in the interval are irregular, and never correspond to the insertion of muscles. If the muscles arise from the interior of the skull, as in the tortoise, the head ought to be small and contracted, and the orbit of the higher animals ought by degrees to grow smaller; as there are muscles attached to its internal surface. Neither of these circumstances, however, occur.

Finally, in the fœtual state, muscles do not act with force enough to influence in any way the form of the head, which however differs as much as in adult age. Thus it is evident that muscles do not determine the form of the skull.

V.

Professor Ackermann, of Heidelberg, thought that the frontal sinuses of man, and the cells between the tables of the skulls of animals, were produced during inspiration; the air, according to him, gradually distending them. He maintained that very active individuals, who take much exercise in walking and running, have larger sinuses than usual, and that animals which live in the open air, and inspire a great deal of it, have the greater number of cells in their skulls. Several considerations, however, prove this assertion, which is not grounded upon experiments, but hypothetically advanced, to be erroneous.

The possibility of the air exerting any distensive power, supposes a great cavity already existing, into which it must be

received; but how has this space between the two tables of the skulls been first produced? Let us however admit the sinuses formed and the air drawn into them, and then ask what may be its action? Ackermann imagines that, being warmed, it distends the cells by expanding. Is it not, however, more probable that it would rather escape by the aperture through which it had entered, than act with such force as to distend them? Even supposing that the air did distend the cells, they ought to be like bladders, and not angular as they are. Moreover, they do not all communicate; there are also cells in the bones of the extremities, even in the fœtus, to which the air never penetrates; why then should not cells be also originally formed between the tables of the skull? Finally, Professor Ackermann's opinion is a mere supposition. I know individuals of sedentary habits who have large sinuses, and others who live much in the open air and have none. The ox, too, and hog have larger cranial cells than the stag, roe, and reindeer; the lazy owl than the active eagle; and the stork, wild duck, wild goose and swallow, have none whatever, notwithstanding their frequent and rapid flights. Ackermann's opinion, therefore, falls to the ground.

In concluding this chapter, I repeat that these considerations on the cause of the size and form of the head are interesting to physiologists, but are in nowise connected with phrenology as a practical science. The business of phrenology is to shew that there is a relation between the manifestations of feelings and intellectual faculties, and size and form of cerebral parts; and that the size of the cerebral parts can be distinguished by the external configuration of the head. Let us then examine in detail this second point of craniology.

CHAPTER II.

It is in general possible to distinguish the size of the Brain and its Parts by examining the external Surface of the Head or Skull.

This proposition is to be regarded under three points of view: First, it is possible and even easy to distinguish the size of the cerebral organs; secondly, we meet with various difficulties and obstacles to this; and, thirdly, it is sometimes impossible.

I. *Possibility of distinguishing the size of the brain and its parts.*

This study must be begun by acquiring exact notions of the different forms and sizes of heads in general and of their particular regions; the common, too large (Pl. I. fig. 1 and 2), or too small size of a head (Pl. II. fig. 1), must be known. The antiques can only be made use of with certain restrictions, for they are generally colossal. It is remarkable, however, that their form and size vary universally. What a difference, for instance, between the heads of women and men, of gladiators, high priests, philosophers, great poets, generals, and others!

The next point should be to acquire precise ideas of the difference between the size and shape of the head and of the skull. The skull in all its dimensions is smaller, but still preserves the general figure of the head unimpaired.

The form and size of the skull will afterwards be shown to indicate those of the brain.

The skull, as I have said already, is composed of two tables, between which lies a cellular spongy mass, called diploe. These tables, scarcely perceptible in infancy, are distinct in

adults; but their distance is so very inconsiderable that in general, up to the period when the brain begins to diminish in size, it is not only possible but easy to determine its size and form by examining the skull,—for there is never any space between the skull and the brain, and, as I have said, the two tables are not sufficiently distant to oppose any obstacle to accuracy.

It is however objected that, because the tables are not parallel, it is impossible to measure the size and form of the brain and its parts from the size and form of the skull. This objection falls to the ground as soon as our procedure is known. It is by no means necessary to appreciate very minute differences of size in order to determine the developement of the cerebral organs. These occupy extensive surfaces, and are of very different volumes betwixt their lowest and highest states of developement: and here let it be understood that the idea of size of organs is not to be confounded with the notion of protuberances. The mutual relations of the organs are to be borne in mind. If one be much, and those in its neighbourhood very little developed, the large organ presents an elevation or protuberance; but, if the neighbouring ones be proportionally developed, the surface remains smooth. Now this may happen whether the organs are small or large. It is also necessary not to confound bony excrescences and irregular elevations with those protuberances which indicate developement of particular organs. Moreover, it is necessary to know those bony points which occur regularly, and sometimes serve as guides in forming conclusions, as the mastoid process behind the ear, the spina cruciata of the occiput, the zygomatic process before the ear, &c.

Every individual has all the organs; and the only point to be determined is whether the whole brain, or one or several of its parts, be large or small. It may also be well to state that it is not always necessary to touch the head to ascertain the state of the cerebral organization; the eye often suffices. The

size of the organs situated in the forehead is even more easily distinguished by sight than by touch. It is necessary to feel the organs only which are covered with hair.

Moreover, the developement of the cerebral organs differs in regard to length and breadth; for the fibres which compose them are sometimes thick and short, sometimes thick and long, or slender and short, or slender and long. This difference of developement must have some influence on the manifestations of the faculties. Long fibres seem to produce more activity, and thick fibres more intensity.

II. *Difficulties of distinguishing the size of certain parts of the brain.*

Every science has its difficulties, and Phrenology is not exempt from them. They are more or less important, and more or less easily overcome. Plattner of Leipsic has said that the size of the organs situated in the middle line of the head cannot be determined, as the longitudinal sinus runs there. But this venous canal is too small to prevent the developement of the organs on each side of it from being ascertained, for they are much larger than it. The hemispheres of the brain being sometimes a little separated, there is then a slight groove along its course. The organs of philoprogenitiveness, self-esteem, and firmness, are frequently found with a channel in their middle. He who knows Phrenology, however, cannot be misled by this.

In appreciating the size of the organs on the sides of the head, particularly of constructiveness, acquisitiveness, and secretiveness, the thickness of muscle which covers them must be taken into account. Those who begin to practise Phrenology find a difficulty in the frontal sinus, and many adversaries even maintain that it is impossible to determine the state of the cerebral parts situated behind it. This objection is particularly applied to the organ of locality. This organ, however, and the bony crest often called frontal sinus, have very different aspects;

the protuberance indicating particular developement of the organ of locality being situated higher in the forehead and presenting a round and large elevation. The organ, however, may exist of very considerable size along with the bony crest or sinus. The frontal sinus or space between the two tables of the frontal bone, throws greater uncertainty over the state of the organs of individuality and size, than over that of locality. A single difficulty, however, is not to cause the whole of a science to be rejected.

The cerebral parts, situated around and behind the orbit, also require some care and experience on the part of the Phrenologist, to be judged of accurately. Their developement is discoverable from the position of the eye-ball, and from the figure of the superciliary ridge. According as the eye-ball is prominent or hidden in the orbit, depressed or pushed sideward, inward, or outward, we may judge of the developement of the organs situated around and behind it.

It may be questioned whether all organs reach the surface; and consequently, whether all faculties of the mind may be determined by the size and shape of the head. There are many convolutions, it is true, in the middle line between the two hemispheres of the brain, and others at the basis and between the anterior and middle lobes, which do not appear on the surface; but it seems to me that a great part, at least, of every organ does present itself there, and further, that all the parts of each organ are equally developed, so that though a portion only appear, the state of the whole may be inferred. The whole cerebellum reaches not the skull, yet its function may be determined from the part which does. The cerebral parts, situated in the middle line between the hemispheres, seem proportionate to the superincumbent convolutions; at least I have always observed a proportion, in the vertical direction, between them.

The greatest difficulty is when any organ is so much developed as to push its neighbours from the places they commonly occupy. There are two varieties of this case: either a single

organ is extremely large, or several are very voluminous, and the surface remains almost smooth. In the first case the difficulty is not very great; for, every organ having its own form and its particular direction, it is only necessary to recal these, in order to ascertain which it is. It requires more practical skill when several neighbouring organs are almost equally developed; but even then the direction of the protuberance and its most prominent point facilitate decision.

Against Phrenology it is further objected that, though it be possible to measure the form and size of the brain by the form and size of the head, it is yet impossible to determine the size of the organs by the size of the head or skull, because they are confined to the surface or to the convolutions of the brain. It is indeed true that the organs are not confined to the surface of the brain; they extend from thence to the great swelling of the occipital hole (medulla oblongata), and probably include even the commissures; for the whole brain constitutes them; but, as the peripheric expansions of the five senses indicate the developement of their respective nerves, so the convolutions of the brain proclaim the developement of its whole mass. This will be understood by analogy: animals which have a large external apparatus of smell, large nostrils, large turbinated bones, and consequently a very considerable nervous expansion upon the pituitary membrane, have the olfactory nerve very much developed. In the same manner the retina, or expansion of the optic nerve, is in proportion to the nerve itself; such also is the case with the organs of the feelings and intellectual faculties. The convolutions are peripheric expansions of internal nervous bundles, to which they consequently bear proportion; it is therefore possible to determine the whole mass of the organs from merely viewing the convolutions.

III. *Impossibility of determining the size of the Brain.*

It still remains for me to speak of those cases in which the form and size of the brain and of its parts are not indicated by the form and size of the head. If the brain have begun to shrink from age or disease, it is impossible to ascertain its size. According to a general law of organic parts, the brain, as it has increased gradually and for a term, begins also after the period of maturity to decrease by degrees; the convolutions, which were plump and prominent in youth, sink and part from each other, and, the composition of their parts being no longer equal to their decomposition, their size therefore diminishes. Then it is that the skull, as to external form and size, often remains the same, whilst its internal table, following the brain, makes it become thick and spongy; the diploe being then not only more considerable, but the tables less solid. Sometimes this shrinking of the brain goes on unequally, and then the skull is very thick in one place and very thin in others. Sometimes, also, the whole grows thin. These are evidently consequences of unequal deposition and absorption in the bone. It may be remarked, that such thin old skulls are broken or depressed by blows, whose slightness would not have done the least harm at the age of maturity. Thus old and decrepit persons do not, under certain points of view, confirm the doctrine of Phrenology, because it is impossible to judge accurately of the size of their brain from the size of their head, and also because the organs are not very active at this age. Yet, to discover and to establish the physiology of the brain, it is sufficient to confine our observations to individuals before the flower of mature age begins to fade.

In certain cases of chronic insanity the brain diminishes in size, as other nerves do, when they have been long diseased, and the internal table follows it, while the external one preserves its usual position. These also are cases in which the size and form of the skull do not indicate the size and form of

the brain. The skulls of the insane are often very thick; but their texture is not so generally spongy as hard, dense and heavy, like ivory. Thickening, however, is not a necessary accompaniment of their augmented density and weight.

Sir E. Home, in his observations on this subject, errs in classing together depression of the skull by external violence and thickening of its different portions. He has no idea of cerebral diminution as a cause of the skull's increased thickness, but always considers this as occasioning such changes as he observed in the brain. Dr. Baillie, in his morbid anatomy, does the same. Yet disease often begins in the brain, and is propagated to the skull. I do not deny, however, that the skull may be diseased, and exercise a pernicious influence on the brain.

Researches relative to the skulls of alienated persons, though important to physiology and pathology in general, and intimately connected with phrenology, are not essential to it in as far as determination of the functions of the brain is concerned. I even admit, in those individuals who have been long diseased, the impossibility of measuring accurately the size of the brain and its parts from the size and shape of the head. For further information relative to the causes of the density and thickness of the skulls of the insane, I refer to my work on Insanity.

SECTION VII.

DIVISION OF THE FACULTIES OF THE MIND.

Philosophers have, at all times, thought it necessary to make divisions and subdivisions among the faculties of the mind. Dr. Gall rejects all which have hitherto been conceived or admitted : the division into instinct in animals, and understanding in man ; that of the human mind into understanding and will, and the subdivision of understanding into attention, memory, judgment, and imagination ; and of will into inclination, propensity, desire and passion. He admits many faculties of the mind, but thinks that all manifest the same modes of action ; he therefore denies the possibility of classing the mental powers in kinds, according to distinctive characters or special modifications. He first speaks of the external senses and their apparatus, and then of the internal faculties and their organs, beginning at the basis of the brain and finishing at its summit, taking only the situation of the respective organs as a guide to the order of his descriptions. I also maintain, with Dr. Gall, that the divisions of the mental faculties, as established by philosophers, are incorrect, but I do not think with him that the cerebral organs are susceptible of the same modes of action. I conceive it possible to divide them, and to establish a new classification according to their special and characteristic functions.

All the functions of man which take place with consciousness constitute animal life. These may be arranged into two *orders*, a division admitted from the remotest antiquity, and known under the names soul and spirit—moral and intellectual faculties—understanding and will—heart and head.—

I shall design them by feelings and intellect, or by *affective* and *intellectual* faculties.

Both orders of the cerebral functions may be subdivided into several genera, and each genus into several species. Some *affective* powers produce only desires, inclinations, or instincts; I denominate them by the general title *propensities.* The name *propensities,* then, is only applied to indicate internal impulses which invite to certain actions. There are other *affective* faculties which are not confined to inclination alone, but have something superadded that may be styled *sentiment.* Self-esteem, for instance, produces a certain propensity to act; but, at the same time, feels another emotion or affection which is not merely propensity. All the faculties which I call *propensities* are common to man and animals, but those of which I now speak, and which I shall name *sentiments,* are partly common to man and animals, and partly proper to man.

The second order of mental powers is destined to make us acquainted with the existence of the external world, with the qualities of the bodies that surround us, and also with their relations; I call them *intellectual.* They may be subdivided into four genera. The first includes the functions of the external senses and of voluntary motion; the second, those of the internal senses, which make man and animals acquainted with external objects and their physical qualities; and the third, the functions connected with the knowledge of relation between objects or their qualities;—these three genera I name *perceptive faculties;* the fourth genus comprises the faculties which act on all the other sensations and notions, and these I name *reflective* faculties.

Each genus of faculties, both affective and intellectual, consists of several species, and each species offers several modifications or varieties, even idiosyncrasies or monstrosities. The essential, however, of the faculties always remains, and is even unaltered by disease. The essential nature of the faculties is that

which must be determined; and here I differ from Dr. Gall entirely. He almost necessarily began by observing peculiar talents and determinate actions in relation to developement of certain cerebral parts: he was in the wrong, however, to give names to these from particular determinate actions; for actions seldom depend on single powers. Dr. Gall's observations were, nevertheless, conducive to the determination of the special faculties and of their sphere of activity; hence to the establishment of a new philosophy of the mind. It is, indeed, highly necessary to indicate the special faculties which produce positive actions; for their mutual influence is so great that the inactivity of one faculty sometimes becomes a cause that certain others act in a determinate manner, which would not have happened, had all been duly balanced and equally active.

The nomenclature given by Dr. Gall is easily understood. It indicates his method of proceeding, and the spirit which conducted him in his observations. There are mechanicians, musicians, mathematicians, metaphysicians, poets, &c.; some persons also are known for their cunning, ambition, pride, quarrelsomeness, benevolence, or religious feelings; and it is certain that persons highly endowed with such talents, and guided by such feelings, have the organs which Dr. Gall speaks of under the titles organs of cunning, religion, pride, ambition, poetry, music, mechanics, mathematics, &c., largely developed.

To succeed in giving specific names to the fundamental powers I was obliged to change the nomenclature. I admit that the organs, as they are named by Dr. Gall, are much developed in persons distinguished by peculiar characters, or individual talents. I only deny that there is an organ of cunning, of religion, of poetry, mathematics, mechanics, &c. These mental operations are compound, and I think that their elements must be determined. I consequently do not give names to the organs according to actions, but according to the nature of faculties only. I shall elucidate my meaning by means of the external senses. There is a power of seeing, and

an organ of sight ; but there is no organ of seeing red, blue, yellow, or squares, triangles, or other forms. We speak of a sense of hearing, and not of a sense of hearing the song of birds, the music of man, or the noise of a cannon, &c. In the same way there is an organ of the propensity to conceal, but none of hypocrisy ; an organ of the desire of applause, but none of emulation or glory ; a sense of veneration, but none of this or that mode of worship, and so on.

This distinction between the faculty itself and its application explains how the same organization, in different individuals, may be accompanied by good or bad actions ; for the essence of the faculty is preserved, and its application alone is good or bad. This subject will be examined in detail when speaking of each special faculty and its organ. As Dr. Gall paid more attention to actions than to the faculties themselves, he constantly complained of his inability to mark the sphere of activity of individual organs. This was impossible in attending only to actions. The feeling of veneration, being directed to the God of Christians, to saints, angels, devils, or natural objects, being satisfied by all sorts of actions, by singing of psalms, by fastings, burning candles, or by charity and peaceableness, &c., is one and the same.

From the preceding considerations it results that a certain order may be established amongst the cerebral organs, and that I may do more than confine myself to Dr. Gall's method of considering them, merely according to their local situations. I shall first speak of the propensities, then of the sentiments, of the external senses, of the perceptive, and finally of the reflective faculties.

In examining the fundamental powers of the mind and their organs, I shall always follow the same procedure : I shall first consider the individual actions, then give the history of the discovery of the organ, and add my remarks where Dr. Gall and I happen to differ in opinion ; I shall describe the seat of

each organ, and name it according to its essential function ; and finally I shall examine its influence on the other faculties, and the effects of its inactivity. It is my intention rather to make known the philosophical spirit of these enquiries, and the manner in which I conceive they ought to be conducted, confirmed, or amended, than to quote the numerous facts I have observed. Dr. Gall is fond of quoting examples ; these, be they ever so numerous, however, can never produce conviction ; I have neither the wish nor the intention to persuade, and therefore invite every one to convince himself by personal examination. The few cases I mention, and the numerous instances brought forward by Dr. Gall, show that we have observed ; we have, therefore, acquired the right to demand that no conclusion be formed until our observations have been repeated.

This is the only way of establishing new discoveries. Is it not painful then to see that this means is not used in Phrenology? I cannot but regret that physiologists and philosophers do not examine with sufficient zeal or care this doctrine, which undoubtedly will one day become the basis of all philosophical, moral, religious, and political science.

I have insisted on the importance of not confounding the fundamental powers with their applications. Now it is not less important to avoid confounding protuberances with general developement. It appears that Dr. Gall is particularly attached to the idea of protuberances, viz. to the principal means of making phrenological discoveries. All his writings, and particularly the three last plates of the large work, confirm me in this opinion. It would be difficult to look at these plates without thinking of protuberances. The reader naturally asks what is in the intervals between the elevations? Such elevations, however, occur but rarely, and the habit of looking for isolated organs, thus acquired by beginners, has undoubtedly retarded the progress of Phrenology. Adversaries also support their objections by supposed exceptions ; for they imagine

that an organ is large only when it presents a protuberance. This, however, is not the case, and it is better to consider the size of the head in general, to divide it into various regions, and to observe which and what parts of each are most developed. The medulla oblongata, or the occipital hole, or the external opening of the ear, will serve as a central point from whence various radii may be drawn. As, for instance, one vertical, from the external opening of the ear to the place which in children corresponds to the fontanel, will divide the head into the frontal and occipital regions. Moreover, I divide it into two regions in its height, by drawing a horizontal line, which begins in the middle of the forehead, and ends above the occipital bone. The region below this I call *basilar*, and that above it *sincipital*. Heads, again, are narrow or wide laterally, and the *lateral* regions are therefore to be examined.

Now the greatest differences are observable in the developement of these various regions, even when the whole surface is smooth; and every person may very speedily convince himself that it is not indifferent to have this or that one very large.

Before I enter into details upon the internal organs, I shall answer a question which may be put in regard to every organ, viz., *Why do you admit a particular organ of this and not of another function?* When actions alone are spoken of, it is certainly difficult to conceive the necessity of particular organs; yet the answer is decisive if we can say,—Experience demonstrates it. Moreover, as I look for fundamental powers, and not merely for their organs and signs, the necessity of every one may be demonstrated even by reasoning, that is, by the general proofs which confirm their plurality. Consider these proofs in relation to every faculty, and a mistake cannot possibly happen. A particular organ for every faculty must necessarily be pointed out:

1. Which exists in one kind of animal and not in another;

2. Which varies in the sexes of the same species;

3. Which is not proportionate to the other faculties of the same individual;

4. Which does not manifest itself simultaneously with the other faculties, that is, which appears or disappears earlier or later than they;

5. Which may act or repose singly;

6. Which individually is propagated in a distinct manner from parents to children; and

7. Which singly may preserve its proper state of health, or be affected by disease.

Dr. Gall did not determine any of the organs in conformity with these views. He followed an empirical method, only looking for organs according to the actions of man. But I have already said that actions are seldom the result of single faculties, and that these must be determined before a true philosophy of the mind can be established. My proceeding, then, is not arbitrary, but is founded on principles, and is adequate to refute the following objections made against the object of our investigations:—

Some adversaries say that too many, others that too few organs are acknowledged, and that they might be multiplied infinitely. The former should know, however, that each is admitted by the same proofs which demonstrate their plurality generally, and that it is verified by experience. The independent existence of one organ is neither more nor less certain than that of any other; and, if similar proofs be admitted confirmatory of one, they must be agreed to in regard to every other. The opponents who think that enough organs are not admitted should consider that every faculty may be applied to an infinite number of objects. Seeing is always seeing, but to what an infinity of objects may the power be directed! Hearing is always hearing, but how various the impressions perceived by this sense! It is the same with the internal

faculties. Constructing is always constructing, but how infinite in number and variety the objects that may be produced! Moreover, it is to be observed, that a great number of actions result from combinations of different powers; and, therefore, it is not surprising to see so many effects produced by a small number of primitive faculties. Are not twenty-four letters of the alphabet sufficient to compose all imaginable words? The muscles of the face are not very numerous, yet almost every individual of the human kind has a different physiognomy. There are few primitive sounds; few primitive colours; only ten primitive signs of numbers; but what an infinity of combinations do not each of these furnish? Let us suppose from thirty to forty primitive faculties of the mind; and then consider all possible combinations, with their modifications, and we shall not feel surprised that we observe such a number of modified functions. I repeat that the organs are not multiplied unnecessarily, but that determinate principles are followed in establishing each of them, such only as nature presents being recognized.

SECTION VIII.

ORDER I.—FEELINGS OR AFFECTIVE FACULTIES.

Genus I.—Propensities.

1. *Organ of Amativeness.*

Physical love is commonly considered as a peculiar sort of sensation; but physiologists and philosophers are not agreed as to its origin. It is certain that none of the causes which are generally admitted suffice to explain its existence; for it is manifested without these, and its energy is not proportionate to them.* It is therefore necessary to find other conditions adequate to account for the phenomena of this desire.

Dr. Gall did not think there was an organ of this propensity in the brain, but discovered it by accident. Being physician to a widow who was subject to violent hysterical fits, during which her head was drawn backwards with great force, he sometimes supported it with his hand, and was astonished by the great thickness and heat of her neck. Acquainted with her peculiar character, he asked himself whether the size of

* Partes genitales, sive testes hominibus et fœminis uterus, propensionem ad venerem excitare nequeunt. Nam in pueris veneris stimulus seminis secretioni sæpè antecedit. Plures eunuchi, quanquam testibus privati, hanc inclinationem conservant. Sunt etiam fœminæ quæ, sine utero natæ, hunc stimulum manifestant. Hinc quidam ex doctrinæ nostræ inimicis, harum rerum minimè inscii, seminis præsentiam in sanguine contendunt, et hanc causam sufficientem existimant. Attamen argumenta hujus generis verâ physiologiâ longè absunt, et vix citatione digna videntur. Nonnulli etiam hujus inclinationis causam in liquore prostatico quærunt; sed in senibus aliquandò fluidi prostatici secretio, sine ullâ veneris inclinatione, copiosissima est.

her neck, and consequent developement of her cerebellum, might not have some relation to her inordinate passion?

Continuing observations begun from this hint, he soon established the point to his own satisfaction; and it is now impossible to unite a greater number of proofs in demonstration of any natural truth, than may be presented to determine the function of the cerebellum.

It would be interesting, as well as important, to show that those animals which have a nervous mass corresponding to the cerebellum reproduce by sexual union. This alone, if it could be verified through all classes of beings, would be sufficient to prove the peculiar function of this portion of the brain. The minuteness of the last animals, however, prevents demonstration by dissection, and at the present we may say the undertaking is impracticable.

In new-born children, the cerebellum is to the brain as one to nine, ten, thirteen, twenty, or more; and in adults as one to five, six, or seven. Professor Ackermann maintained that the cerebellum was perfectly developed at the end of the second year. Dr. Gall and I have compared the heads and skulls of children from two till sixteen years old, and have always found that at these ages it is still imperfectly developed. But in proportion as the cerebellum increases its function appears. It has been said that the cerebellum grows in proportion as the sexual propensity becomes active; but other proofs show evidently that the developement of the cerebellum always precedes this desire.

In adults, the cerebellum having attained its full size, the amative propensity is most energetic, and then there is a constant relation between its developement and the goadings of the inclination. It is well known that men feel in very different degrees the impulses of the sexual passion: some individuals are almost or wholly deprived of it; others experience it moderately; whilst others again feel its ungovernable violence. In the first, the cerebellum is very small (*Pl.* III. *fig.* 2); in the

second, it is of a middling size; and in the third class it is very large and prominent (*Pl.* III. *fig.* 1).*

* Plures viros hâcce appetentiâ abusos, eamque ob causam carceratos, vidimus, quibus, è magnitudine cerebelli, collum quàm maximum fuit. Equos, tauros, arietesque, quibus profusius collum, majore propagandi vi donatos esse, agricolæ et armentarii à longinquitate temporum animadverterunt. Notum est etiam columbas, quæ in hâc re aliis excellunt, à majore magnitudine colli distingui.

Virum et mares majorem quàm fœminas copulandi cupidinem sentire certum est. "In venere exercenda," ait Hippocrates de Geniturâ, "longè minorem quàm vir voluptatem mulier percipit, vir verò etiam diuturniorem." Plurima apud animalia mos est unum marem pluribus cum fœminis vivere; sed in paucis speciebus una fœmina pluribus cum maribus conjuncta est. In multis speciebus, mares per totum annum veneris stimulum sentiunt, dùm fœminæ certis solùm anni temporibus à maribus suis amari volunt. Imò, in animalibus matrimonio conjunctis, mares fœminis multò salaciores sunt.

In omni animalium specie, cerebelli configuratio ad veneris appetentiam referre videtur. Nam mares fœminis, et fœminæ maribus, ejusdem speciei inprimis, dediti sunt.

A nimiâ hujus organi activitate perturbatio oritur. In erotomaniâ cerebellum grande plerumquè observatur. Asseri tamen non potest, omnibus erotomaniâ laborantibus magnum esse cerebellum. Hoc organon enim, sicut omnia alia, sine ullâ præcipuâ magnitudine, morbidâ activitate ægrotare potest.

Actio reciproca, quæ existit inter cerebellum et partes genitales, etiam cerebelii functiones probat. Sic castratio cerebelli incrementum imminuit, nam in hominibus atque animalibus castratis cerebellum crescere desinit. Quam ob rem eunuchis atque animalibus, in prima ætate castratis, est collum valdè exiguum, et copulandi cupido nulla. Contrà, homines cæteraque animalia, post plenos annos castrati, quanquam testium expertes, sensum tamen eroticum et copulandi stimulum conservant. Hinc testes cupidinem non producere patet.

Pubertatis tempore, mutua colli genitaliumque organorum actio est præcipuè insignis. Tùm crescit barba, tùm crescit larynx, tùm vox mutatur, itemque testes et alia organa genitalia officiis suis fungi incipiunt. Eodem tempore crescit cerebellum. Dùm animalia catuliunt, eorum colla insolito cum tepore tumescunt, vox etiam raucissima evenit.

"Non illam nutrix orienti luce revisens,
"Hesterno collum potuit circumdare filo."

Quæ facta veteribus planè nota fuère, sed causa usque ad nostram ætatem latuit. Castratio, eâdem de causâ, craniorum figuras necnon armentorum atque aliorum animalium cornua mutat. Bobus castratis

Besides it is indubitable that men (*Pl.* V. *fig.* 1 and 2), and male animals in general, have a larger cerebellum than women

longiora, quàm tauris, sunt cornua. Cervorum, testibus injuriam passis, cornua malè crescunt; cornubus defalcatis paulò antè rugitum, multò minùs certa est eorum propagatio.

Cerebello vulnerato, partes genitales in sympathiam trahuntur. Gall. Vindobonæ Austriacorum, duos milites, è vulnerato occipite, impotentes fieri observavit, quorum unus, duobus post annis, veneris appetentiam et copulandi potestatem iterùm recepit, puerosque genuit. Formey Berolinensis narravit nobis historiam cujusdam qui, occipite vulnerato, primùm priapismo, dein impotentiâ, vexatus est: veruntamen sex post mensibus virilitatem recuperavit. Baronius Larrey, Parisiis, plures milites, occipite vulneratos, quorum partes genitales decreverant, nobis monstravit. Unus, dùm septemdecim annos natus, occipite vulneratus est. Posteà penis et testes magnitudine propriâ defecerunt; vox fœminea permansit, et barba per vitam fuit nulla. Veteres semen in cerebello secerni ac per spinam descendere putabant. Sic Hippocrates, de Geniturâ, III. sub fine: "Quibuscunque juxta aures venæ sectæ sunt, hi coëunt quidem et genituram emittunt, verùm modicam, et debilem, ac infœcundam; nam plurima genituræ pars à capite juxta aures in spinalem medullam procedit." Alio loco (Lib. de Aëribus, Aquis, et Locis, Sect. I.): "Atque mihi, inquit, sanè videntur eâ medicatione seipsos perdere. Venæ enim retrò aures sunt, quas si quis secet, sterilitatem inferet his quibus secantur; quarè id etiam ipsis ex earum incisione accidere certum est. Quandò igitur posteà uxores adeunt, impotentesque se factos vident, cum illis coïre primùm quidem nihil molestius cogitantes quiescunt (Scythæ)."

Apollonius Rhodius, de Medeæ amore erga Jasona loquens, illam ardore consumi et capite usque ad infimum nervum dolore cruciari, asserit Professor Reinhold, Lipsiæ, cervici cujusdam pueri, ad diminuendam ophthalmiam, setatium posuit. Evenit priapismus continuus, et irritationis causam amoveri oportuit. In morbis glandulæ parotis, partes genitales variis modis affliciuntur. Laqueo suspensi et strangulati plerumque erectionem et seminis emissionem habent. Menstruationis suppressæ à vesicatione cervicis restitutæ exempla dantur. Cervicis frictiones cum spirituosis in histeriam remedium præclare dicuntur. In erotomaniâ partes genitales sæpè inflammatæ sunt, sed hæc inflammatio non est idiopathica sed sympathica. Eroticus furor hominis necnon et equorum à castratione sanatus est: melius tamen sit morbum frangere per remedia in inflammationem cerebelli: nam inflammatione sanatâ priapismus sedatur. Omnes similes observationes ad actionem reciprocam colli ac partium genitalium pertinentes, cerebelli functionem probant.

Plurimi fatui sunt qui, quanquam mentis et rationis inopes, tamen veneris stimulum vehementem sentiunt, eorumque amentia masturbationi, cui dediti sunt, vulgò tribuitur. Veneris abusu et nimiùm seminis effusione

(*Pl.* IV. *fig.* 1 and 2), and females. This, however, is by no means an invariable law; there are exceptions, and these occur

intellectu debilitari minimè negandum est; tamen in hôc casu fatuorum, masturbatio non est causa, sed effectus amentiæ. His miseris frons et superior cerebri pars admodùm exigua, collum verò et pars capitis posterior grandia sunt. Hinc ratione carentes, ut alia animalia, voluptati indulgent. Idem observatur in quibusdam *Cretini* appellatis. Hi sæpè paulùm cerebri cum grandi cerebello habent. Non tamen verum est, illorum organa genitalia semper grandiora, eosque admodùm lascivos esse. Sic est in multis, sed non in omnibus. In pluribus fatuis atque hydrocephalis valdè lascivis cerebelli et partium genitalium magnitudo non est exigua. Hoc verò facilè explanari potest. Cerebellum speciale et distinctum systema comprehendit, et hinc functiones cerebri turbatæ atque oppressæ esse possunt, dùm cerebellum, per tentorium à cerebro separatum, suis officiis fungi continuatur. Quoniam honor, pudor et ratiocinium desunt, hi miseri veneris appetentiam sequuntur.

Demùm gesticulationes seu lingua naturalis hujus propensionis sedem indicant. Alibi hanc materiem pleniùs explicabo. Regulum profitebor ex quâ gesticulationes congruunt cum organorum sedibus. Quùm copulandi amor nos agit, caput totumque corpus supina sunt; manus in posteriorem colli partem feruntur. Quas amoris gesticulationes pictores et statuarii sæpè sunt imitati. In avibus atque mammalibus, antè coïtum, mares, ut in fœminis copulandi appetentiam incitet, earum colla sæpenumerò titillant. Hinc, quùm de omnibus hisce exemplis et argumentis cogitamus, cerebellum amoris seu veneris appetentiæ organum esse admittere debemus.

Nonnulli contendunt, copulandi appetentiam organam proprium habere non posse, quia plurima animalia tantùm certis anni temporibus catuliunt. Hæc objectio eamdem vim haberet, si contra aliam, quæcumque sit, amoris causam opponeretur; exempli gratiâ si sanguinem, aut partes genitales, hujus appetentiæ causam acciperemus. Porrò plurima organa non omni tempore officiis suis fungi notum est; mammæ non semper lac secernunt. Idem igitur cerebello accidere potest. Difficilis quidem est quæstio, utrùm animalium cerebella, durante rugitu, magnitudine crescant, an magis excitentur; experimenta desunt, scimus tamen, dùm catuliunt, colla insolito modo calescere.

Alii opponunt, vegetabilia sine cerebello propagari: hinc idem in animalibus fieri posse, atque partes genitales sufficientes esse dicunt. Partes genitales hujus appetentiæ causam sufficientem non esse, jam suprà demonstravi. In animalium ac plantarum propagatione comparata, propagatio ipsa cum ejus appetentia confunditur. In vegetabilibus propagatio est simplex fructificatio, actus organicus; in animalibus autem, præter actum organicum, ejus appetentia quoque existit. In plantis atque animalibus, procreatio æquè se habet ac nutritus. Plantæ nutrimentum capiunt, sed neque esuri-

more frequently among mankind than among animals: yet there is a constant relation between the developement of the cerebellum and the propensity in question.

It has been objected that the brain in general is larger in men than in women, and that consequently it is not astonishing that the cerebella of men should also be larger than those of women. Many individuals, however, have large brains and small cerebella, and *vice versâ*. There is consequently no proportion between the brain and the cerebellum. The sexual propensity, moreover, is never in proportion to the size of the brain; but, cæteris paribus, always to that of the cerebellum.

This organ, like all others, may be confirmed from observing nations, as well as individuals, who feel this propensity in a high degree.

We may even take the position of the cerebellum as confirmatory of its destination. After hunger and thirst, which nature

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unt nec sitiunt, id est, neque famem nec sitem sentiunt, sicut animalibus res est. Prætereà, animalia nutrimenti saporis quoque conscia sunt, plantæ verò hòc sensu carent. Hinc in plantis, nutritus est simplex; in animalibus, tribus functionem speciebus constat: digestione scilicet seu assimilatione, famis et sitis sensatione et gustu. Procreationis eadem est ratio. In plantis est solummodo actus organicus; in animalibus, præter testium et uteri actionem organicam, hujus rei appetentia existit, et è coitu animalia delicias capiunt. Atque hujus appetentiæ organum est cerebellum.

Organa, ad eamdem functionem pertinentia, sese invicèm incitare notum est; sic fames incitat gustum, gustus famem, et ambo incitant digestionem. Sic quoque copulandi appetentia seminis secretionem, et hæc istam incitat. Attamen, licet variarum partium incitatio sit mutua, earum ratio non est directa. Digestio appetitui non semper respondet, nec appetitus digestioni; itemque nec veneris appetentia seminis secretionem, nec hæc functio illam propensionem semper adæquat.

Ex hisce considerationibus hujus appetentiæ abusus facillimè concipiuntur. Oriuntur enim eodem modo quo abusus famis et sitis. Corporis regenerandi causâ nutrimenta sumenda sunt; sed quùm nutrimenta, aut è nimiâ quantitate, aut è malâ ipsorum qualitate, saluti obnoxia sunt, evenit abusus. Famem sitimque è quadam organisatione pendere certum est, sed voracitatis ac ebrietatis organum non datur. Res item se habet cum veneris appetentiâ; pendet à cerebello, nimia autem cerebelli incitatio aut ejus conditio vitiosa abusum producit.

has given to secure the individual, the desire destined to preserve the species is the most common in animals. The cerebellum accordingly is the most inferior portion of the brain.

From all that has been said, and from the infinite number of observations made on man and animals, we conclude that the special function of the cerebellum is fairly established, and think that the mutilations practised by M. Flourens, at Paris, do not invalidate our conclusions drawn from the healthy state.

The only point we have still to examine is the name which will best express the primitive faculty. Dr. Gall calls it the *instinct of propagation.* It certainly is essential to that end, but it often acts without there being any intention to continue the species, and is also satisfied in various ways incompatible with such a purpose. We do not usually speak of the nerves of the instinct of nutrition, but of those of hunger and thirst. The same language should be used when speaking of the organ in question. Dr. Gall's name does not express the whole sphere of activity of the faculty. Now I constantly insist on the importance of adopting titles which do not designate determinate actions. Physical love indicates a more general application than the love or instinct of propagation, but this instinct or desire is no more physical than the love of offspring, or self-love, or the love of glory, &c.; I therefore prefer the name of *Amativeness**.

To observe accurately, and to substantiate the organs in general, it is necessary to know their situations. The organ of amativeness is situated at the top of the neck, and its size may be known by considering the space between the mastoid process immediately behind the ear, and the protuberance called occipital spine in the middle of the hind head, in all its dimensions. Those who would make observations on the cerebellum of the lower animals should know the variety of structure it presents

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* The reasons which have induced the author to make new names, and to choose the termination *iveness* for his nomenclature of the propensities, are mentioned in the Preface, to which the reader is referred.

among them. In birds it is almost single; in the mammalia it has lateral parts or lobes added to its fundamental or middle portion (processus vermiformis).

Practical Reflections.

The reader must bear in mind that the cerebellum is only the organ of the amative impulse, and not of the generative power. Its influence in society is immense, and has caused great disorder as well in civil as in other peculiar, especially religious, institutions, where its activity has not been duly considered. Can it be reasonable to admit every youth to a profession the members of which are compelled to swear chastity for life? If such a vow be necessary, would it not be better to destine to the profession of religion those only who are born eunuchs, or those in whom the cerebellum is very little active?

The disorderly satisfaction of the amative propensity undermines the health of individuals, and even of the species; and I think that as soon as young persons understand the difference and the distinction of the sexual functions, they should be taught the laws of propagation, and not be kept in a state of ignorance that may provoke a fatal curiosity, compromising in the end their own and their descendants' bodily and mental constitution. This work being devoted to physiological enquiries alone, it would be out of place to say more on the influence of the organ of amativeness here. Important reflections might be made since we see seduction encouraged, and have daily opportunities of witnessing the disastrous consequences of neglecting its proper direction. I wish every one were convinced how nearly legislators, moralists, teachers, physicians, and all friends of humanity are concerned in regulating the sexual propensity.

II. *Organ of Philoprogenitiveness.*

I shall consider, in the first place, whether it be necessary or not to admit a particular feeling which watches over and pro-

vides for the wants of a helpless offspring, and then state the circumstances which led to the discovery of its organ.

Neither males nor females of certain tribes of animals take any care of their progeny. Their eggs are resigned to chance, or rather to the influence of some external agent. This happens amongst insects, fishes, and reptiles. Among birds, too, the cuckoo is a striking example of absence of parental solicitude. Its propensity to physical love is great, but it neither builds a nest nor hatches its eggs. These are deposited in the nests of small birds which live on insects, and they hatch and rear the young cuckoo, with particular attachment.

The females of other kinds of animals alone take care of their progeny; bulls, stallions, dogs, cocks, &c., are indifferent about their young, while the cow, mare, bitch, hen, &c., are extremely attached to them.

The males and females of other tribes, again, form an attachment for life, and both sexes tend their offspring. The instinct of parental love is however more energetic in the females. The fox, which resembles in so many points, differs from the dog in so far as he is attached to his female for life, shares in all her cares, and, if she happen to be killed, continues to provide for the young ones. Parental love, nevertheless, is stronger in the female than in the male; for, if both be pursued, the male leaves the young sooner than the female. Many kinds of birds also live in pairs, and are jointly solicitous in satisfying the wants of the young. These differences are constant; does not each of them, even on the slightest consideration, seem to require peculiar organization?

In the human race this propensity is generally stronger in women than in men. This truth is proclaimed not only by the difference between fathers and mothers, but also by that between the sexes universally. We never hire male servants to take care of our children. Girls show the predominance of philoprogenitiveness early in life, by their choice of play-things. They attach themselves to dolls and cradles, whilst boys prefer drums, horses, whips, &c.

Among all kinds of animals which take care of their progeny, there are always some females who feel little or none of the propensity, and certain males who manifest the inclination strongly. There are even women who look on children as a heavy burthen, though the majority deem them their chief treasure and greatest source of happiness; and this not only in the miserable portion society, but indiscriminately among rich and poor. Cases of insanity are by no means infrequent in which the function of parental love is deranged.

All the general arguments, in fine, adduced to prove the plurality of the organs, may be applied to the organ of philoprogenitiveness in particular.

To answer the objections made against love of offspring, as a fundamental power, will be an easy task. The feeling, it has been said, is the result of self-love, of the desire of suckling, and of the moral sentiments, and not of a peculiar propensity. These causes, though commonly admitted, are however inadequate to produce the love of offspring, since in many animals strongly attached to their progeny they do not exist. Birds, and the males of mammiferous animals, do not give suck, yet many of them love their young. Mothers very frequently do not suckle their children; they are nevertheless exceedingly attached to them. No animal, lower in the scale than man, has any idea of duty or moral responsibility; and the tenderness of mothers of the human species is never in proportion to the moral and religious sentiments with which they are endowed.

Others again have said this propensity cannot be fundamental because it is not always active. The same objection may, with equal propriety, be made against every instinct of animals, and against all the desires of man. No fundamental power seems capable of acting continually; each demands repose from time to time, and its intermissions of activity are shorter or longer, wherever the cause of activity resides, whether in the blood, in the viscera, or in the cerebral parts.

It is further objected that mothers are not alike fond of

every individual of their family, that they sometimes prefer one to another, nay, that they even hate one, and remain attached to the rest.

This observation holds good, not only in mankind, but also among animals; still it is wrong to infer from it that philoprogenitiveness is no fundamental faculty. The external senses are not equally nor always agreeably affected by all kinds of impressions, nevertheless they have their particular functions. The stomach digests one sort of food more easily than another, and, notwithstanding, it remains the organ of digestion. Moreover, philoprogenitiveness is not the only feeling that acts and requires satisfaction; a mother will naturally prefer that child who pleases the greatest number of her faculties, and whose dispositions most nearly resemble her own; and she may be less kind to another who is differently constituted, or who disturbs her happiness.

The love of offspring, then, must be considered as a fundamental power, and a peculiar organ for its manifestations admitted. Let us now see how this was discovered.

At an early period of his observations, Dr. Gall was attracted by a peculiar and very regularly occurring protuberance on the back part of the heads of females (*Pl.* IV. *fig.* 1). He also found a similar projection in the skulls of children and of monkeys. Convinced that the large mass of brain in this situation must perform some important function in the animal economy, all his efforts, during a period of five years, to detect its office, were notwithstanding unsuccessful. At first he fancied it might indicate the greater nervous irritability and sensibility of women and children; but he soon saw that irritability was a common quality of every organ, and therefore abandoned this supposition. In his courses of lectures, delivered from time to time, he was in the habit of mentioning his difficulties relative to this protuberance, when at last a clergyman remarked that monkeys were very much attached to their young ones. Reflecting on this suggestion, viewing the situation of the cerebral part immediately above the organ of

amativeness, and appealing to observation, Dr. Gall soon established its proper function. The developement of the organ he found constantly to coincide with the energy of the propensity which prompts to protect and succour the young. Species, sexes, and individuals, powerfully endowed with the love of offspring, have the organ greatly developed. Women and females have it commonly larger than men and males. Dr. Gall possesses the skull of a woman who became diseased and had the notion of being pregnant with five children: the corresponding organ in this skull is exceedingly large. Several nations are remarkable for this propensity. The attachment of negroes to their offspring is known; and they have the organization on which the feeling depends extremely prominent.

As the English language possesses no single word that indicates love of offspring, I have employed two Greek roots which, in conjunction, define accurately the primitive propensity. The title that results is long; but I could not say philogenitiveness, because that would indicate the love of producing offspring. As, however, progeny is synonymous with offspring, and philoprogeny means the love of offspring, I adopt the term *philoprogenitiveness* for the faculty of producing the love of offspring.

Practical Reflections.

The faculty of philoprogenitiveness being too active produces many disorders, principally by spoiling children. Parents might often spare themselves a great deal of pain and much uneasiness, did they maintain this propensity in harmony with the other primitive faculties. The small size of the organ, or its inactivity, renders indifferent to children (*Pl.* IV. *fig.* 2). This condition ought to be considered as one of the indirect causes prompting to infanticide. I have examined the heads of twenty-nine women guilty of infanticide, and in twenty-five of them the organ of philoprogenitiveness was very small. The small size of this organ, however, does not excite a mother to destroy her child; but she who is destitute

of the love of offspring is less able to combat those external circumstances which provoke a commission of crime. Such a mother will not resist as she would have done, had she been influenced by the powerful sway which philoprogenitiveness exerts over the female mind.

The aim which nature had in view when she implanted this faculty is obvious—the preservation of the newly-born being, and thereby the very existence of the earth's inhabitants.

I have already pointed out the place of philoprogenitiveness. Although the protuberance which indicates its great developement be commonly single, the organ itself is always double, that is, there is one on each side of the middle line of the head. It appears single when the posterior lobes of the brain are very near to each other, and double when they are somewhat separated. This difference of form is common to all the cerebral organs situated on each side of the mesial plane.

By means of this and the preceding organ, it is very easy to distinguish the skulls of males from those of females of the same kind; and it is peculiarly worthy of notice that throughout all animals there is a striking similarity preserved in the form of the skulls of each sex. The skulls of men and males are generally shorter and wider, those of women and females longer and narrower.

Some phrenologists in Scotland think that a softness of manner, and a sympathy for whatever is weak and helpless, generally accompany and are connected with large philoprogenitiveness. I have already mentioned that Dr. Gall entertained a similar idea at the beginning, but gave it up. Tender feelings may be combined with love of offspring; but this propensity may also be very active in individuals of rough and brutal manners. The Carib race, endowed with great ferocity, are, however, attached to their young, and submit to all the inconveniences of bringing them up amidst privations and hardships of every kind. The tiger, hyæna, and the most ferocious tribes of animals, show a fondness for their young not inferior to that of the gentlest and most

docile. Philoprogenitiveness produces only sympathy for young beings, but not tenderness in general. This is the result of other feelings.

III. *Organ of Inhabitiveness.*

When we examine the habits and manners of animals, we see that different kinds are attached to particular regions and countries. Nature, having intended that every region and every country should be inhabited, has assigned to all animals their dwellings, and given to every species a propensity to live in some particular local situation. If we place an animal in any region other than that destined for it, it feels ill or uneasy, and seeks to return to its natural dwelling. Some seek the water from the first moment of their existence. Turtles and ducks, as soon as they are hatched, run towards it. Other young animals again stay upon dry land; some of these prefer elevated and mountainous regions; some the level country; and others the marshes. Among the feathered tribes, some live in the higher, others in the lower regions; for the power of flying does not produce the instinct that prompts the eagle to soar into the highest regions of air: other birds, though their power of flying is very great, have not this propensity. Some birds build on the tops, some in the middle, and others in holes of trees; some on the earth; some in the banks of rivers, &c. Now what is the cause of this modified instinct?

It is often said that animals choose their particular dwellings according to their general organization. Birds are organized to fly, fishes to swim, and the chamois and wild goat to climb upon mountains.

It is true that the external and internal organization of animals is adapted to their manner of living; fishes cannot exist in the air, nor birds under water. Moreover, animals commonly find their food in the places which they inhabit. This alone, however, is not the only condition that determines their

particular dwellings. Some love situations where there is no food; the chamois and wild goat dwell upon rocks which are entirely barren, and are obliged to descend into the middle regions to find their sustenance. Again, there are kinds which like the higher regions of the air, and which yet seek their food upon the earth. Eagles and hawks hover very high, but catch their prey upon the ground. Does the lark require to ascend into the air to sing? In the philosophical part, where I treat of the innateness of the faculties, I show that it is impossible to attribute the origin of any faculty of man or animals to external circumstances.

Parrots, eagles, pigeons, and swallows, live upon very different substances, and are very differently organized; yet they are all fond of flying high in the air. In conformity, then, with these considerations, we must admit the existence of a particular faculty with its special organ, which determines animals in the selection of a habitation.

Let us now say a few words on the opinion of Dr. Gall upon this subject. After having paid great attention to the organ of pride in man, he examined such animals as are generally esteemed proud, the cock, peacock, &c., but could distinguish no analogy between the cerebral organs of these animals and those of proud persons. He, however, observed in tribes which have a great propensity to elevated stations, as in the chamois and wild goat, a protuberance which he identified with the organ that produces pride and haughtiness in man.

It is certain, and must be conceded, that animals which live on mountains, or which are fond of high regions, have one part of their brain more developed than the species of the same genus which live in flat and low countries. This difference is very sensible in roes, hares, rats, &c. One species of rat lives in canals, cellars, and the lower parts of houses; another in corn-lofts and garrets, and the difference of their cerebral organization is very distinguishable. Yet it appears to me that this circumstance by no means authorizes the con-

clusion that the faculty which leads animals to seek elevated situations is essentially the same as that which makes man proud and haughty.

Dr. Gall thinks that the situation of the organ of pride in man corresponds with that of the organ of the instinct which prompts animals to seek physical elevation. I, however, maintain that the place of an organ can prove nothing, when animals of different kinds are spoken of. For, if different animals be endowed with dissimilar faculties, their organs may still occupy corresponding places of the head. We have, I suppose, three sorts, whose faculties are quite different. The organs of these fill, in each, the skull; of course, it is here evidently impossible to maintain that the faculties of the three are the same, because corresponding places of the head are well developed. It is true that, when an animal possesses a faculty in common with man, the organ of that faculty is situated in both in the same part of the head. Now it appears to me that the place of the protuberance which indicates the instinct of animals for physical height does not correspond with that which in man produces self-esteem and pride. In animals it is immediately above the organ of philoprogenitiveness; but the corresponding cerebral part in man was unobserved by and unknown to Dr. Gall. Certainly, it is not the organ of self-esteem; this lies much higher. Hence, a comparison of the situations of the organs of both faculties is rather against than in favour of Dr. Gall's assertion.

He also supports his opinion by saying that different faculties which are merely physical in animals become moral in man, and quotes physical love as an example. Now I think that all physical faculties common to man and animals preserve their nature in man, and that the faculty of physical love is in itself always the same. It is obvious, however, that this propensity may be accompanied by other sentiments, especially by attachment. The bull is sometimes particularly attached to one amongst a herd of cows; and I have

seen canary birds which would not mate with certain individuals. Though separated, they still remained attached to their former partners. Moreover, if the organ of amativeness be singly active in man, it is always without morality; in some hydrocephalic persons and idiots from birth physical love resembles that of animals entirely. Hence, whatever is moral in amativeness depends on other faculties which accompany it; it is also observed that man and animals modify the manifestation of the propensity in proportion as they are endowed with other dispositions. If a man or an animal be prone to attachment and physical love at the same time, these faculties will act conjointly; physical love will be modified by attachment, and attachment by physical love.

Platonic love, it is replied, ordinarily finishes in physical love. I agree with this; but can we therefore conclude that platonic is the same as physical love? I am not hungry because I have taste or smell; but if the sense of smell be stimulated by any savoury odour, and that of taste and the feeling of hunger be thereby excited, and notwithstanding my first intention not to eat I eat, will it be maintained that smell and the desire to eat are the same? If we examine platonic or moral love, we find that all the sentiments which are felt at the same time with the propensity to physical love may be attributed to other special faculties and their respective organs. In the same manner it seems to me impossible to confound the instinct of physical height with the sentiment of self-love and pride: I believe it possible to have a great opinion of one's self in all regions and in all countries.

Dr. Gall adds that mountaineers are proud, and particularly attached to their independence and moral liberty. I do not think that the inhabitants of Switzerland have more natural pride than the Hungarians. The former, however, have often struggled for independence, while the latter could not endure the civil liberties which the Emperor Joseph the Second allowed them.

Dr. Gall quotes several examples of proud persons being particularly fond of climbing upon mountains, and to great elevations. My experience has shown me both proud and humble persons, who felt a peculiar pleasure in going upon towers and other elevated places; but they did so to see the scenery of the surrounding country. This inclination then belongs to the organ of locality, as I shall afterwards explain.

Finally, Dr. Gall particularly insists on those natural expressions, or actions, by which the sentiment of pride is manifested. Proud children, says he, mount upon chairs, in order to be on a level with grown-up persons; and adults of small stature often do the same to gratify their self-love; proud persons keep their body erect, and have a haughty gait. In general, all expressions of pride and superiority are combined with physical elevation: thus kings and emperors sit upon elevated thrones; they receive their power from above, &c. &c.

All external manifestations of proud persons may be explained upon the pathognomical principle of the motions of the body in general, and the motions of the head in particular, being in the direction of the organ which is active. Now the organ of pride is situated upwards and backwards, and all the motions of pride are in these directions.

Thus I separate the instinct which carries animals to physical elevation from the sentiment which produces self-love and pride; and I consider the first as a modification of the feeling which determines the dwelling-places of animals.

The cerebral part above the organ of philoprogenitiveness in man is more or less developed, independently of the neighbouring parts, and must be considered as endowed with some peculiar function, which, however, it is difficult to ascertain. The instinct of animals to choose a peculiar dwelling-place must be attached to a particular organ. This being modified, its modified functions are explained in the same way as those of the senses of taste and smell in herbivorous and carnivorous

animals; the organ, however, cannot be pointed out by comparing animals which live in different elements; our observations must be confined to such as inhabit the same element or the same country, and chiefly to individuals remarkable for a higher degree of the peculiar disposition. This propensity being common to many animals, its organ must be deeply seated in the brain, and must be looked for in the region of the other propensities. I consider in animals the cerebral part immediately above the organ of philoprogenitiveness, as the organ of the instinct that prompts them to select a peculiar dwelling, and call it the organ of inhabitiveness. My attention has been and is still directed to such individuals of the human kind as show a particular disposition in regard to their dwelling-place. Some nations are extremely attached to their country, while others are readily induced to migrate. Some tribes wander about without fixed habitations, while others have a settled home. Mountaineers are commonly much attached to their native soil, and those of them who visit capitals or foreign countries seem chiefly led by the hope of gaining money enough to return home and buy a little property, even though the land should be dearer there than elsewhere. I therefore invite the phrenologists who have an opportunity of visiting various nations particularly fond of their country to examine the developement of the organ marked No. III., and situated immediately above philoprogenitiveness.

In all civilized nations, some individuals have a great predilection for residing in the country. If professional pursuits oblige them to live in town, their endeavour is to collect a fortune as speedily as possible, that they may indulge their leading propensity. I have examined the heads of several individuals of this description, and found the parts in question much developed.

A friend of mine, M. de Tremmon, of Paris, once asked me why I did not look for an organ of which agriculture is a result, as I speak of organs which dispose man to hunt, to

build, to collect food, and to cultivate arts and sciences. This question was undoubtedly philosophical, since nature attaches pleasure to every occupation on which the preservation of the species depends. Now, agriculture contributes greatly to the general welfare, and it is not probable that nature was negligent in this point. Hence, I have also examined the organ marked No. III., in relation to this peculiar disposition, and have found it large in several who are fond of living in the country and of agricultural pursuits. I mention these ideas only to excite investigation, not by any means as being certain and established. Once confirmed, *inhabitiveness* will be considered as presenting modifications in the same way as every other special power does.

Mr. Combe, and several members of the Phrenological Society of Edinburgh, think that the function of the cerebral part we are discussing "*is to maintain two or more powers in simultaneous and combined activity, so that they may be directed towards one object.*" They name it the organ of *concentrativeness.*

"The first step," says Mr. Combe*, "in the discovery of this function, was the observation that certain individuals are naturally prone to sedentary habits, and find it painful to stir abroad without a special motive, and this too of considerable urgency. Other persons experience equal difficulty in settling; their strongest desire is to engage in some active employment, in which their attention shall be carried as it were out of themselves, and occupied in external objects and occurrences. The former were perceived to possess this organ large, the latter small. Some patients, afflicted with nervous debility, feel extreme aversion to active pursuits, in whom the organ may be small; but these are cases of disease, and the observations now alluded to were made on individuals in the vigour of life and health.

* Elements of Phrenology, p. 29.

"The next step was the observation that some persons possess a natural tendency to live, as it were, within themselves, whose minds seem habitually occupied with internal meditation, and of supporting a close and vigorous attention; who, in short, have a natural facility of concentrating their thoughts, without the tendency to be distracted by the intrusion of feelings or ideas foreign to the main point under consideration. Such persons possess a command over their intellectual powers, so as to be able to apply them in their whole vigour to the pursuit which forms the object of their study for the time; and hence they produce the greatest possible results from the intellectual endowment which nature has bestowed on them. Other individuals, on the other hand, have been observed, who find their thoughts lost in dissipation, who are unable to keep the leading idea in its situation of becoming prominence, are distracted by accessories, and, in short, experience great difficulty in combining their whole powers to a single object. These persons, even with considerable reflecting talents, fail to produce a corresponding general effect, and their mental productions are characterized by the intrusion of irrelevant ideas, and the unperceived omission of important particulars, arising from the disjointed action of their several faculties. The organ was perceived to be large in the former, and small in the latter.

"Probably it is by the exercise of a power resembling concentrativeness, that animals, such as the chamois, who are fond of heights, are enabled to maintain in action all those faculties which are necessary to preserve their position, while they browse in difficult or dangerous situations; and, at the same time, avoid the aim of the hunter. There appears, therefore, nothing in the limited observations of Dr. Gall inconsistent with the more extensive views now taken of the functions of the faculty. Concentrativeness, however, is stated as only probable, and the function is open to elucidation from farther observations."

I beg my readers to remark, that Phrenology can be proved

only by observation. If No. III. be in relation to mental concentration, as described by Mr. Combe, it will be ascertained by the constant and invariable laws of nature. I am sorry to say that my experience is not favourable to the opinion of Mr. Combe. I know individuals greatly disposed to sedentary life and to mental contemplation who have No. III. very small; and others, who are constantly occupied with external objects and occurrences, who possess it large. I also know persons who are able to apply their intellectual powers in their whole vigour to the pursuit which forms the object of their study for the time, and whose No. III. is small, while the brain is much developed at No. III. in others who are unable to keep the leading idea in its situation of becoming prominence, and who are distracted by accessories.

This organ also is commonly larger in women than in men, and I leave every one to decide upon the sex which supports the more close and vigorous attention. It is, moreover, larger in Negroes and in the Celtic tribes than in the Teutonic races; in the French, for instance, it is larger than in the Germans. The national character of these nations not only does not confirm the opinion of Mr. Combe, but is in direct contradiction to it.

Comparative physiology also militates against it. Concentration, as described by Mr. Combe, is rather intellectual than affective; its place among the lower feelings would be in opposition to the general arrangement, according to which organs of similar functions are constantly near each other.

If concentration be necessary to chamois while they browse in difficult and dangerous situations, and at the same time avoid the aim of the hunter, all animals ought to have it in proportion as they are exposed to danger; this, however, is not the case. Moreover, secretiveness and cautiousness suffice to explain the precaution which animals take for their safety; and cautiousness is very active in the chamois. Again, if they be guided by concentration, as Mr. Combe says, they

must still possess the organ of *inhabitiveness,* since this instinct and concentrativeness can never be identified.

Again, no one in concentrating his mind and in directing his powers to one object, exhibits gestures and motions indicative of activity in the back part of the head; the whole of the natural language shows that concentration takes place in the forehead. I was very attentive to the improvisator Sgricci in private society, and whilst publicly engaged in composing a five-act tragedy; his natural language showed very great activity in the forehead; and the part marked No. III. on the head is very slightly developed in his brain. Nay, after all, I do not conceive the necessity of a peculiar organ of concentration any more than of will. Let an individual possess an active constitution, with large organs of individuality, eventuality, comparison, firmness, cautiousness, self-esteem, and courage, and he will concentrate his mind, and direct it as the individual powers he has very active command. I further think that concentrativeness, as described by Mr. Combe, cannot possibly be a primitive faculty, since it can neither act alone, nor appear diseased singly; and since its very existence only becomes apparent by the presence of other powers directed to one object. Now this seems to me inadmissible; I consider it as a characteristic sign of every primitive faculty that it can act alone and independently of any other special power.

IV.—*Organ of Adhesiveness.*

Friendship has long been considered a result of reflection, a consequence of some analogy between the faculties of individuals, or an effect of mutual interest. Some particular instinct, however, producing various attachments, must be admitted amongst animals in whom no moral consideration nor any idea of interest can be supposed to have weight. This seems to be evident from numerous examples among dogs; not

all of them being susceptible of the same degree of attachment, though the treatment they receive ought to excite it; some, on the contrary, being attached in opposition to their interest, and, though abused and maltreated, still remaining faithful to their master. Moreover, there is something involuntary in attachment, and its manifestations are too early and too sudden to result from reflection. Even criminals have frequently displayed great attachment to their associates; and instances are not wanting in which they have preferred self-destruction to denunciation of their companions. Thus a highwayman, confined in the prison of Lichtenstein, near Vienna, hanged himself, that he might not be forced to betray his accomplices.

These considerations prove the necessity of some organ of attachment. It is difficult, however, to point out its seat in man; his actions being sometimes embellished by the appearance of friendship, whilst but little of the feeling subsists in reality. Dr. Gall examined the head of a woman, at Vienna, who was looked upon as a model of friendship; she had suffered many changes of fortune, had been alternately rich and poor, but was always attached to her former friends. He found the cerebral part situated upward and outward from the organ of philoprogenitiveness very prominent, and called it the organ of friendship. He neglected, during a long time, to make further observations on this organ, but many facts have subsequently been gathered, and its seat may now be considered as ascertained. (*Pl.* V., *fig.* 1. & 2. iv.)

The strength of attachment is very different in different species of animals, and even in individuals of the same kind; it is greater in women than in men, and greater in one nation than in another.

This faculty induces individuals of the same kinds to congregate, and live in society. In several species, too, the males and females are attached for life, and dwell domestically together. The fox and many birds are examples of this. The two sexes would leave each other as soon as the

amative propensity is satisfied, did not nature, by a peculiar instinct, prevent this. Here it is to be observed that the instinct of attachment for life, and that of society, are not mere degrees of energy of the faculty of attachment. For there are animals which live in society without being attached for life, as the bull, dog, cock, &c.; others which live in society, and in families, as starlings, ravens, crows, &c.; and others again which are attached for life without living in society, as the fox, magpie, &c. The instinct, therefore, of living in society, and that of living in family, are modifications proper and peculiar in their nature, in the same way as the relish for vegetables or flesh is a modification of smell and taste in carnivorous and herbivorous animals. Man belongs to the class of animals which is social and attached for life; society and marriage are consequently not effects of human reflection, but of an original decree of nature.

It seems to me that the special faculty now under consideration extends its sphere of activity still farther, and that it attaches us to all around us, to inanimate beings, to plants, animals and things; in short, to all we possess, whether animate or inanimate. It produces also the feeling of habit or custom. Friendship, consequently, is only one of the modifications of the faculty. If attachment for life belong to some portion of its organ, it must be to that which is nearest the organ of philoprogenitiveness. In conformity with our preceding considerations, the name *Adhesiveness* seems to me capable of denoting this special faculty, whose objects are friendship, marriage, society, and attachment in general. The term adhesiveness has been used hitherto merely in a physical sense; but many other words, which now bear a mental signification, were in the like case originally. Attachment would indicate only the effect of this faculty, and I require a name which expresses the faculty of producing such an effect. Abuse results from its too great energy, in regretting over-much the loss of a friend, &c. Without attachment men become anchorites and hermits.

V. *Organ of Combativeness.*

The disposition to quarrel and fight is one unfortunately but too apparent in the world. Dr. Gall, to discover its cause, called together boys from the streets, and made them fight. There were, of course, some who were fond of it, and others who were peaceable and timid. In those who came willingly to blows, that part of the head which corresponds to the posterior inferior angle of the parietal bone behind the mastoid process, was prominent (*Pl.* V. *fig.* 1. v.); in those who declined the combat, the same place was flat or depressed.—(*Pl.* IV. *fig.* 2. v.). Similar configurations were found in the heads of brave and valiant officers, of quarrelsome students, of duellists, and of those whose greatest pleasure consisted in fighting and making themselves feared; and of the inoffensive and peacefully disposed. This organ is generally more developed in men and males than in women and females. Moreover, the propensity to fight is stronger in some nations than in others, and is sometimes very active in lunatics. Hence it must be considered as fundamental.

Dr. Gall at first named "organ of courage" the part in the situation indicated. Considering, however, that it is possible for a man to be courageous in various ways, to have courage to do any thing of which he thinks himself capable, to play on an instrument or sing before company, though he may have no propensity to fight, he changed this name for that of quarrelsomeness, and then for that of self-defence, which last he retains.

The propensity to fight is active in different degrees, not only in man, but also among the various species of animals; some never fight, others are fond of fighting. Even individuals of the same kind differ in their manifestations of this disposition. One dog incessantly looks for an opportunity to give battle, and never shrinks from an opponent; another passes peaceably along, and flies on the approach of an adversary.

The heads of courageous animals, between and behind the

ears, are wide (*Pl.* VII. *fig.* 1. and 3. v.), those of timid and shy ones, on the contrary, are narrow at the same spot. (*Pl.* VII. *fig.* 2. and 4. v.). The different organization of game and dunghill fowls is very marked in the situation indicated. Horse jockeys, and those who are fond of fighting cocks, have long been familiar with the fact.

It is objected that the propensity to fight results from bodily strength. There are, however, several species which though weak are fond of fighting, while others, though large and strong, avoid it. We may find striking examples of this among dogs. The fighting cock is also smaller than the dunghill bird, and hares are stronger than rabbits, yet less courageous. Some men and even women, though very weak and delicate, are nevertheless intrepid and courageous, while tall and robust individuals are oftentimes cowardly and complying.

Courage and the capacity to meet and to repel attack is necessary to animals as soon as they are attached to females, to progeny, to dwellings, or to friends; for, according to the arrangement of nature, it is necessary to fight in order to defend. Such a propensity must therefore exist for purposes of defence; but it seems to me that it is, like all others, of general application, and not limited to self-defence; I therefore call the cerebral part in which it inheres the organ of the propensity to fight, or of combativeness. Sometimes it acts with greater energy than is proper, is delighted with combats, and then produces disputes, quarrelsomeness and attack, which are all abuses.

The ancient artists seem to have known the configuration indicative of a high degree of this propensity; for they have given it to the heads of their gladiators. It may be asked, if the absence or inactivity of this organ produces fear. Dr. Gall thinks it does, but it appears to me that the absence of no organ can originate a positive sentiment such as fear. It is certainly conceivable that the absence of an organ may produce modifications in the manner of thinking and feeling; that the absence of this, for instance, may render a character peace-

fully disposed, but I imagine that a positive action can alone produce fear. I think that Dr. Gall generally errs when he speaks of negative qualities. If fear result from the absence of courage, I cannot conceive how it is possible to be at the same time courageous and fearful; yet this happens both among animals and mankind. We shall see afterwards that the sensations of fear and anxiety are ascribable to the organ of cautiousness.

VI. *Organ of the propensity to destroy, or of Destructiveness.*

A difference in the skulls of carnivorous and herbivorous animals gave the first idea of the existence of an organ of destructiveness. If we place the skull of a carnivorous animal horizontally, and trace a vertical line through the external meatus auditorius, a good portion of the cerebral mass will be found situated behind it, whilst in herbivorous animals the corresponding portion of the brain will be observed to be very small.

Every one agrees that there are carnivorous animals, but all have not the same opinion regarding the cause of this. Some say it is useless to search in the brain for a particular organ of destruction, which determines the kind of food nature destined for man and animals, because she has given to carnivorous animals the feeling of hunger, the taste, teeth, and such instruments as are necessary for seizing and killing their prey. These instruments, however, prove only the harmony that subsists between the internal faculties and the corporeal structure. Man employs his hands in taking aliments, but some interior sensation advertises him of the necessity of taking food. The tiger, lion, cat, &c., have teeth and claws; but an internal power excites these animals to use them. A sheep could not

employ such instruments, any more than does an idiot his hands to perform offices for which they are adapted.

The propensity to kill exists beyond doubt in the world, and it is more or less energetic in animals of different species, and even in individuals of the same kind. There are some species which kill no more than they require for their nourishment; while others, as the wolf, tiger, polecat, &c., kill all living beings around them, seemingly for the mere pleasure of destroying.

It is readily granted that many animals have the propensity to kill. But let us see whether man is also endowed with a like disposition. Carnivorous animals confine themselves to the destruction of a certain number of species for food; but man kills, from the insect to the elephant and whale, to apply them to his purposes; he almost alone is truly omnivorous, and he sheds the blood even of his fellow-creatures. I find it superfluous to combat those who say that man eats flesh only from depravity or vicious habit; because his teeth evidently partake of the structure of those of both carnivorous and herbivorous animals; his stomach rather resembles that of carnivorous than of frugivorous tribes; and finally, because he thrives upon flesh, and, in some regions, it constitutes all his subsistence.

In man this feeling presents different degrees of activity, from mere indifference to the pain of animals to the pleasure of seeing them killed, or even to the most irresistible desire of killing. This doctrine may shock sensibility, but it is not the less true; and whoever would study nature, and judge sanely of its phenomena, must be ready to admit the existence of things as they are. It may be observed that among children, as well as adults, among the uncultivated as well as the polite and well-bred classes of society, certain individuals are very sensible, and others very indifferent to the sufferings of other beings. Some persons feel a pleasure in tormenting animals, and in seeing them tortured or killed, even when it is impos-

sible to ascribe this disposition to bad habit or neglected education. There are even individuals who choose such a profession as will gratify this propensity, if it be very energetic. Thus a journeyman apothecary at Vienna became an executioner; the son of a rich merchant of the same city renounced commerce, and became a butcher; and a rich Dutchman paid the butchers, who furnished the navy with beef, for permission to kill the oxen.

We may also determine the existence of this propensity and its diversities by the impressions made upon different spectators by public executions; these are insupportable to some, and afford great delight to others. George Selwyn sought eagerly for such spectacles, and always endeavoured to stand near the executioner. It is also reported of La Condamine that, being fond of executions, and endeavouring to pass through the crowd upon a certain occasion, as the soldiers pushed him back, the executioner said to them, "Let that gentleman pass; he is an amateur." Professor Bruggmans, of Leyden, told us of a Dutch priest, whose desire to kill and to see animals killed was so great, that he became chaplain of a regiment, solely to have an opportunity of seeing men destroyed in battle. To gratify the same propensity still farther, he kept in his house a number of domestic animals, as dogs, cats, &c., to have the pleasure of killing their young with his own hand. He also slaughtered the animals for his kitchen, and was acquainted with all the hangmen of the country, who sent him regular notice of each execution, and he did not grudge to travel on foot for several days to witness the scene. In the field of battle the propensity to destroy is active in very different degrees: one soldier is overjoyed at sight of the blood which he sheds, while another, moved by compassion, spares the vanquished, and stops of his own accord whenever victory is secure.

Highwaymen are frequently not contented with robbing, but manifest the most sanguinary inclination to torment and murder

without necessity. John Rosbeck not only maltreated his victims, to make them show their concealed treasures, but invented and employed the most outrageous cruelties merely to witness their sufferings; neither fear nor torture could break him of this horrible habit; after his first apprehension, he was confined for eighteen months in a small subterraneous dungeon, his feet loaded with chains, standing in muddy water up to his ancles; in addition to all this, he was tortured most cruelly; nevertheless, he confessed nothing. On being enlarged, his first act was to steal in full daylight, and, having committed new murders, he was finally executed*. At the beginning of the last century, several murders were committed in Holland, on the frontiers of the province of Cleves. For a long time the murderer escaped detection, but at last suspicion fell on an old man, who gained his livelihood by playing on the violin at country weddings, in consequence of some expressions of his children; led before the justice, he confessed thirty-four murders, and said that he had committed them without any cause of enmity, and without any intention of robbing, but only because he was extremely delighted with bloodshed. At Strasburg two keepers of the cathedral having been assassinated, all efforts to discover the murderer for a long time were ineffectual; at last a postillion was shot by a clergyman, called Frick. This monster had hired a post-chaise for the express purpose of satisfying his horrible propensity to destroy. Arrested, he confessed himself the murderer of both keepers of the cathedral. This wretch was rich, and had never stolen. For his crimes he was condemned to be burned at Strasburg. "Louis XV." says M. de Lacretelle†, "felt a rooted aversion against a brother of the Duke of Bourbon-Condé, Count of Charolois, who would have renewed all the crimes of Nero, had he ever mounted a throne. While a child he betrayed a cruelty of disposition which excited horror. He delighted in shedding

* History of Schinderhannes, t. ii. p. 1.

† Histoire de la France, t. ii. p. 59.

the blood of those he had debauched, and in exercising various barbarities on the courtezans who were brought to him. Popular tradition, as well as history, accuses him of different homicides, and it is added that these were committed without cause, and when unmoved by anger; for he shot at slaters, merely to have the barbarous pleasure of seeing them fall from the tops of the houses."

These latter facts, which fortunately for humanity are very rare, prove that this terrible propensity is sometimes quite independent of education, of example, or of habit, and that it depends on innate constitution alone. Many crimes indeed are so detestable, and are accompanied with such repugnant and horrible circumstances, that it would be impossible to explain them in any other way. Prochasca relates* that a woman of Milan caressed little children, led them home, killed them, salted their flesh, and eat of it every day. He quotes also the case of a person whom this passion excited, and who killed a traveller and a young girl to eat them. Gaubius† speaks of a girl whose father was incited by a violent impulse to eat human flesh, and who, to gratify his singular desire, committed several murders. This girl, though separated from her father for a long time, and educated carefully among respectable persons not related to her family, was overcome by the same horrible desire to eat human flesh.

Many idiots are mischievous, and manifest the propensity to kill. Numerous facts are recorded in books, and several have fallen under my own observation.

Individuals are occasionally alienated only in the propensity to destroy. At Berlin, Mr. Mayer showed us a soldier whose general health was bad; he was very irritable, and much weakened by grief for the loss of his wife; he had every month a fit of violent convulsions, whose approach he felt, accompanied with an immoderate propensity to kill; he

* Opere minore, tom. ii. p. 98.

† Oratio prima de regimine mentis quod medicorum est.

then begged to be chained; but at the end of a few days the fit left him, the fatal propensity disappeared, and he himself fixed the period when he might be safely delivered. At Haina we met with a man who at certain periods felt an irresistible desire to maltreat others; he also knew his unfortunate propensity, and begged to be confined till his fit was over. A person of a melancholy turn of mind, having seen a criminal executed, was so much upset by the spectacle, that he suddenly became possessed with a propensity to kill, although he felt the strongest aversion to commit the act; he spoke of his deplorable situation weeping bitterly, struck his head, wrung his hands, exhorted himself, and admonished his friends to take care and to fly; he even thanked them if they restrained him.

Pinel has also frequently observed the fierce impulse to destroy, and speaks of one man who showed no mark of alienation in memory, imagination, or judgment, but who confessed that his propensity to murder was so involuntary and irresistible, that his wife, notwithstanding the love he bore her, was near being immolated, he having only time to warn her to fly. In his lucid intervals he made the most melancholy reflections, expressed horror at himself, and was disgusted with life to such a degree, that he several times attempted to put an end to his existence. "What reason," said he, "have I to cut the throat of the overseer of the hospital who treats us with so much humanity? Yet in the moments of my fury I feel the same desire to attack him as others, and to thrust a dagger into his breast." Another madman, who, during six months in the year, suffered periodical fits of fury, felt the decrease of the symptoms, pointed out the periods when the danger was over, and begged those about him not to let him free when he felt incapable of governing his blind impulse to destroy. In his calm intervals he confessed that, during his fits, it would be impossible for him to restrain it; he said that, if he met any one then, he saw, as it were, the blood circulating in their

veins, and felt an irresistible desire to suck it, and to tear their limbs with his teeth, to do so more commodiously. Pinel also relates the history of a young female, who every morning had a fit of mania, during which she tore all that fell under her hands, and committed every sort of violence against those who came near her, so that they were obliged to restrain her by a strait jacket; yet in the afternoon she repented of the actions of the morning, and asked pardon, which she always despaired of obtaining. Pinel quotes another example of a monk alienated by devotion, who thought he had one night seen the Virgin Mary surrounded by a choir of angels and happy spirits, and received an express order to kill a certain person whom he considered as an infidel; he would have executed this commission, had not his actions and manner betrayed him. The same author speaks of a credulous vine-dresser, who was so violently shaken by the sermon of a missionary, that he thought himself and his family damned to everlasting pains, if he did not save them by the baptism of blood, or martyrdom. He therefore first endeavoured to murder his wife, who escaped with difficulty; he then killed two of his children to procure them eternal life; and when confined to prison, before trial, he cut the throat of a criminal in the same room with him, still with the intention of doing some expiatory act. His insanity being proved, he was ordered to be shut up in the Bicêtre for life. Long solitary confinement exalted his imagination, and, because he had not been executed, he fancied himself the Almighty, or, according to his own expression, the fourth person of the Trinity, sent to save the world by the baptism of blood. Having been confined for ten years, he became tranquil, and was permitted to converse with the other convalescents in the court of the hospital. He passed four years in this way, and his health seemed restored, but he was again suddenly seized with his former superstitious and sanguinary ideas. The day before Christmas he conceived the

project of offering up an expiatory sacrifice by killing all who might fall under his hands; he consequently got possession of a shoemaker's knife, with which he gave the keeper a thrust from behind, which fortunately slipped over the ribs; he then cut the throats of two other lunatics, and would have continued his homicides, had he not been overpowered and prevented.

These and many similar examples, which occur in the state of health and disease, prove that the propensity to kill and destroy is innate, in man as well as in animals. Does not the whole history of mankind indeed confirm this position? In all ages the earth has been drenched with blood. The God of Israel was fond of blood-shedding; and without it there was no remission of sin. With what view then has nature created this propensity?

We cannot imagine that the propensity to destroy is given to man that he may murder his fellow-creatures. Carnivorous animals, though endowed with the propensity, do not kill individuals of their own kind; they only use it in slaying that they themselves may live. What then is the natural food of man? To a great extent the flesh of other animals, and this he can only procure by inflicting death. Does this propensity then determine the sort of food proper for those possessed of it? Dr. Gall thinks it does: I am not of his opinion. It is certain that the propensities of animals are in relation to their whole nature, and that the disposition to kill is in relation to the sort of food they use; but an impulse to kill is not the same as an impulse to choose flesh as aliment. One special faculty produces the propensity to kill, another makes choice of flesh. There is consequently no proportion between the propensity to kill and the want of food. Some animals destroy more than is necessary for their support. Some of the human kind like meat, but cannot slay an animal; others have no reluctance to kill, and yet prefer vegetables for nourishment. Children, in

general, have the propensity to destroy more energetic than grown-up persons; yet they prefer fruits and vegetables to meat.

We have still to enquire into the essential nature of this faculty. I think that its sphere of activity is wider than the mere disposition which it generates to take away life. It seems to produce the propensity to destroy in general, without distinction of object, or manner of destroying. It may wreak itself upon inanimate things, animals, or man, and in this signification may then be perceived a necessary and consistent power in the plan of creation. Throughout nature one being lives upon another, and violent death is consequently a law in the system of the world. Had nature indeed created animals and destined them to live upon the flesh of others, without giving them at the same time the means of obtaining their object, and inclination to inflict death, there would have been contradiction. Nature has even taught carnivorous animals to put others to death in the most speedy way possible, by wounding their neck opposite the place where the spinal chord decussates. Sometimes also there is a necessity for destroying what is useless, before its place can be supplied by what is useful; and many things relatively hurtful provoke us to destroy them. In this sense it is lawful to destroy others to preserve ourselves; nay, the act is even rewarded, and looked on as virtuous. On the contrary, whenever the faculty leads us to destroy what ought to be preserved, it is abused.

This faculty then is gratified by destroying in general, and its manifestations are perceived in those who like to pinch, scratch, bite, break, tear, cut, stab, strangle, demolish, devastate, burn, drown, kill, poison, murder or assassinate.

Dr. Gall formerly called its organ the organ of murder, because he discovered it of large size in the heads of two murderers; but no faculty can be named from its abuse. The error Dr. Gall committed, however, was natural, for the func-

tions of all the organs are most easily discovered in their states of extreme developement, when they are very apt to produce abuses. Such then was the origin of this erroneous title of a faculty whose well-regulated employment is, like that of every other, essential to life. I think the name organ of the propensity to destroy, or of destructiveness, is the most general and the most conformable to its sphere of activity. We are convinced by a great number of observations that the seat of this organ is on the side of the head immediately above the ear.—(*Pl.* VI. & VIII. *fig.* 1 & 2. vi.)

VII. *Organ of the Propensity to conceal, or Secretiveness*.*

Cunning is so active amongst mankind that Dr. Gall soon conceived the idea of looking for its organ in the brain, and observation very soon led him to its seat. He complains, however, of not being able to determine the sphere of its activity: he ascribes to the same organ cunning, prudence, the *savoir faire*, the capacity of finding means necessary to insure success, hypocrisy, lying, intrigue, dissimulation, duplicity and falsehood; in poets, the talent of inventing or conceiving interesting plots for romances and dramatic pieces; and, finally, he attributes to it slyness in animals. In all individuals remarkable for such actions a considerable or large developement of the organ situated in the middle of the side of the head, above the organ of the propensity to destroy, is to be observed. (*Pl.* VI. *fig.* 1 & 2. vii.)

What then is the fundamental power of this organ? Dr. Gall first observed it in a person deeply involved in debt, but

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* This organ was formerly No. 9; in future I shall treat of it immediately after destructiveness, as it belongs to the middle lobes of the brain; and acquisitiveness and constructiveness, formerly 8 and 7, are portions of the cerebral mass which lies above the fissura Sylvii. Anatomy indicates this rectification, and reasoning is not against it, because secretiveness is necessary to the propensities already examined, as well as to those which follow.

who had the address to conceal his real situation from all his creditors. From what I have related above of Dr. Gall's opinion of the functions of this organ, it follows that he observed only the different actions of the faculty, but did not determine the special power itself. By his manner of proceeding, it is scarcely possible to determine the sphere of activity of an organ, because the functions of the faculties are infinite. If we determine the special faculties without considering the objects upon which and the manner in which they act, their sphere of activity is easily understood. Thus, if I consider the faculty of the person in whom this organ was first observed, if I examine the manners of sly animals, and consider the essence of their slyness, and more especially if I consider the behaviour of man and animals, when they exercise functions of this kind, it seems to me that the special faculty is the propensity to be clandestine in general—to be secret in thoughts, words, things, or projects. The fox is careful not to be observed; a cat watching a mouse moves not a limb; sly animals, if pursued, hide themselves dexterously; a dog secretes his bone; and cunning persons conceal their intentions, and sometimes profess opinions opposite to those they really entertain. Hence the special faculty seems to be the propensity to conceal, without determinate direction as to objects or manners of concealing. The uses and abuses of this faculty have various names, but concealment is one element in all its manifestations.

VIII. *Organ of the Propensity to acquire, or of Acquisitiveness*.*

It is a fact that many individuals have a particular propensity to steal or rob. History informs us that Victor Ama-

* The name *Acquisitiveness*, proposed by the Phrenologists of Edinburgh, seems preferable to that of covetiveness, formerly used to designate this primitive faculty.

deus I., king of Sardinia, was, upon all occasions, in the habit of pilfering objects of little value. I have the history of a well-bred individual, who, from infancy, was given to thieving. He entered the military service, hoping that the severity of its discipline might prevent him from indulging his propensity. However, as he continued to steal, he narrowly escaped hanging. Still struggling against and anxious to overcome his inclination, he studied theology, and became a Capuchin. But the disposition followed him into the convent, and he could not resist gratifying it by stealing such articles as candlesticks, snuffers, scissors, drinking cups and glasses; but he did not conceal his stolen goods; he said that he had taken them away that the owners might have the trouble of carrying them home again. There was a person employed by the government of Austria, settled at Presburg, who filled two rooms with stolen articles, of which he never dared to make any use. The wife of Gaubius, the famous physician at Leyden, felt such a strong propensity to steal, that she always endeavoured to take something away from the shops in which she made purchases. Her husband ordered a servant to follow her, to prevent, or at least to compensate her thefts. The Countess M***, at Wesel, and J***, at Frankfort, manifested a similar thievish disposition. Madame de N*** had been educated with great care, her understanding and talents entitled her to a distinguished place in society, but all would not secure her against an overwhelming propensity to steal. Lavater speaks of a physician who never left the rooms of his patients without putting something into his pocket, as keys, scissors, knives, spoons, thimbles, buckles, &c., but who sent them back again to their owners. Moritz, in his treatise on the human mind, details the history of a certain thief, whose propensity to steal was so energetic, that even when dying he stretched out his hand with the intention of stealing his confessor's snuff-box. Dr. Benard, physician to the king of Bavaria, related to us the history of an Alsatian, who was rich,

and not at all avaricious, but who had a great propensity to steal. He had been educated with much care, and sometimes severely punished on account of his unhappy disposition; his father made him a soldier, and, as he continued to rob in the army, he was hanged. We have the history of a very learned man's son, who excelled his comrades at school, but who from his earliest infancy robbed his parents and all those around him. Every kind of correction was useless; the military service was tried, but though he several times suffered severe punishment, nothing could restrain his propensity to steal. The chaplain of a regiment in Prussia, a man of great intelligence and ability, could not help stealing from the officers. The commander esteemed him much, but, as soon as the chaplain made his appearance, desks, presses, and cupboards were shut up, for nothing on which he could lay his hands was safe; he seemed almost to act without a motive, for he restored, with pleasure, the things he had stolen. At Copenhagen Dr. Gall and I saw an incorrigible thief in prison, who sometimes distributed what he had filched among the poor. There was another who had been shut up for the seventh time; he observed that it seemed impossible to alter his behaviour; and therefore begged earnestly to be kept in prison, and provided with the means of earning a livelihood. A young Kalmuck, brought to Vienna by Count Stahrenberg, ambassador of Austria at the court of St. Petersburgh, became melancholic, and fell into a nostalgia, because his confessor, who instructed him in religion and morality, forbade him to steal. The confessor, a man of understanding, discovered the cause of his disease, and gave him permission to steal, on condition that he would give back the articles he pilfered. The young Kalmuck profited by this license, and having stolen his confessor's watch during the consecration of the mass, he, leaping with joy, restored it after the service was over.

Moreover, the propensity to steal is proved by the state of disease. We know several cases in which women felt it in a

high degree only during pregnancy; and certain individuals manifest it only when alienated. Hence it is obvious that this propensity must be innate.

We might multiply examples of this kind almost to infinity; they prove that the inclination to steal is not always the effect of bad education, of poverty, idleness, or of the want of religious and moral sentiments. This truth is so generally felt that every one winks at a little theft committed by rich persons, who in other respects conduct themselves well. These thefts are said to be the consequences of mental abstraction.

We have examined the heads of a very great number of thieves; and it is unquestionable that those who have a great propensity to steal, have a particular part of the brain greatly developed.

However, to consider stealing a natural propensity, is so contradictory to common opinion, that the idea has excited much opposition. It has been said that stealing supposes the pre-existence of property, and that, as property is the result of social convention, stealing cannot be owing to any natural propensity; consequently, that it is absurd to admit an organ of theft. In this objection there are two things to be considered; and first, whether property itself be not grounded upon some natural and particular instinct? When in the philosophical part I treat of the innateness of the faculties, I shall show that many actions which are considered as the effect of society, or as factitious, result from particular innate faculties. We have already seen that society itself is the consequence of a particular propensity, with which all other faculties in their manifestations are necessarily combined. It is also easy to demonstrate that the sentiment of property is natural and not factitious; even animals possess it: birds have their own nests, quadrupeds their burrows, and all defend their habitations against foreign aggression. Tame animals have also their stalls in the stable, and on entering every one takes its own. Nightingales, red-breasts, &c., have their dis-

tricts, and drive away all others of their kind, even their young, when they are grown up. The constancy of storks and swallows to those nesting-places of which they have once taken possession is well known. Bees and many insects fight even till death in defence of their hives or nests against intruders. Every one is aware that a dog defends his bone more courageously in his master's than in a stranger's house. Sportsmen and gamekeepers observe that of some species of animals a certain number only inhabit the same district, and do not permit others of their kind to approach or take possession of their territories. Each herd of chamois drives away all others from the tract it occupies. Man does the same. Suppose two persons living together in a state of nature, as it is called; if the one gather fruit, and the other endeavour to eat it, will not the gatherer feel that the fruit is his peculiar property? Examples might be greatly multiplied in illustration; those already cited prove clearly that the sentiment of property is natural to animals and man, and anterior to and independent of legislation. In animals this sentiment submits only to force; but man, susceptible of moral feelings and obedient to justice, determines the conditions under which objects become property. The sentiment, therefore, must have preceded and produced laws of property. Laws of themselves cannot give birth to any feeling. Now we must enquire whether stealing is natural; and, if so, the effect of a special propensity. Our opponents say, that to answer in the affirmative is both ridiculous and dangerous: ridiculous, because nature could not bestow any faculty absolutely hurtful on man; dangerous, because it would apologize for acts punished as crimes by the law. To this objection Dr. Gall used to answer: No one can deny that theft occurs in the world; and, as it exists, it was not against the will of the Creator; the propensity to steal is also more or less energetic; and there are very few who have never stolen any thing; finally, the organ is very considerable in inveterate thieves.

We cannot, however, think that God has created any faculty purely injurious to mankind, which would be the conclusion were there an organ whose sole function was theft. On the other hand, it is certain that there is no action without a faculty, and no manifestation of a faculty without organization. Theft, therefore, must depend upon a certain faculty, and this must be manifested by means of an organ; but theft, being injurious, can only be an abuse of that faculty. This point may be made clearer by analogical reasoning. Gluttony and drunkenness are effects of a certain power, but there is no faculty solely destined to these actions: they are abuses of the special propensity which feels hunger and thirst. Adultery and incest are not peculiar faculties; they are abuses of the amative propensity. Quarrelsomeness is likewise an abuse of the propensity to fight. Moreover the organ under consideration cannot be that of theft, because various persons who have it much developed never steal; they cannot, however, be destitute of that which is its fundamental function. To this Dr. Gall replies that he cannot determine whether any person he meets in society, with this organ large, has stolen or not—that he knows only the disposition. This answer does not, however, remove the force of the objection; the faculty would still be the same, viz. the disposition to steal. Hence we must examine into the elements of the propensity which produces theft. May it be the faculty which occasions property, and prompts to keep possession? Dr. Gall actually calls the organ that of property. But some thieves steal without intending to retain the article, and both men and animals occasionally filch things entirely useless to them: magpies and ravens, for instance, carry away money, spoons, stones, and similar things, of which they can make no use: certain thieves also restore, or suffer to be restored, whatever they have taken away. Consequently, the faculty which steals is not essentially that which keeps possession; it precedes this, and is rather the propensity to take possession. The name possession, therefore, does not characterize the special faculty.

From all I have observed in animals and man relative to the functions of this faculty, it seems to me that its essence is a propensity to acquire, without determining objects or manners of acquiring; that it gives a desire for every sort of property; it also produces selfishness, for those largely endowed with it never forget themselves; the objects they desire, however, and the means they take to acquire, whether gaming, trade, industry, or theft, result from the influence of all the other faculties.

This faculty of acquisitiveness is essentially necessary to man and animals, as their subsistence often depends on it. It is acquisitiveness which prompts to make provision for the future. As some carnivorous animals kill more than is necessary for their maintenance, in the same way animals and man not only gather what is immediately necessary, but hoard up stores, sometimes take what belongs to others, and collect articles of which they can make no use. The abuses of the faculty have different names according to circumstances, as usury, plagiarism, fraud, theft.

Having thus determined the special faculty of this organ, and explained the nature of its abuses, its admission can no longer be said to be dangerous. The organ of the propensity is situated at the temples, beneath the anterior inferior angle of the parietal bone (*Pl.* VIII. *fig.* 2. viii.), and the name acquisitiveness designates the sphere of its activity very well.

IX. *Organ of Constructiveness.*

Dr. Gall observed that those who displayed a peculiar disposition to mechanical arts had a face of a somewhat parallel form, as large at the temples as at the cheeks; from thence he inferred that the disposition to mechanical arts was indicated when the brain at the temples is prominent or large (*Pl.* X. *fig.* 2. ix). Further observations on mechanicians, architects, sculptors, and painters, in whom this organ is large, soon

pointed out its precise situation. The skulls of animals which build and make burrows, and of others which do not, present a remarkable difference at the place of this organ, as is seen in the heads of rabbits and of hares. The beaver, marmot, field-mouse, &c., have it distinctly expressed.

In a certain skull preserved at Rome, said to be that of Raphael, the organ of which I speak is very large. Dr. Gall possesses the skull of a milliner of Vienna, who was very dexterous in changing the forms of her wares, and in it also the organ in question is prominent.

Adversaries of Phrenology may ridicule a comparison between Raphael, a milliner, and a field-mouse. They may laugh at a doctrine which, as they conclude, attributes to a similar organ the sublime conceptions of Raphael, the petty productions of a milliner, and the inartificial habitation of a field-mouse. But does not the sloth creep by means of organs similar to those by which the horse gallops and the roe bounds with the swiftness of the wind? Does not the ass bray by means of organs similar to those by which a Catalani sings? The faculty I now consider did not alone give rise to the sublime conceptions of Raphael; it was, however, essential to their execution; for it seems to me to produce every thing that may be called construction. By its means birds build nests, rabbits make burrows, the beaver its hut, and man constructs from the hovel to the palaces of kings and the temples of God. It produces fortifications, ships, the engines of war, the implements of manufactures, instruments of all kinds, furniture, clothes, and toys; it is essential not only in every mechanical profession, but in all that in any way require manual nicety, as in the arts of drawing, engraving, writing, carving, and sculpture. Locksmiths, watch-makers, joiners, turners, &c., are directed by it. The propensity to construct generally, or constructiveness, seems to me the special faculty of its organ; it, therefore, constitutes only one part of the mechanical arts, giving manual dexterity,

and being destined merely to execute mechanical conceptions, whatever their nature.

Too large a developement of this organ produces abuses. A man, for instance, may ruin his family by building, or peril his life by constructing dies for coining false money, &c.

Genus II.—Sentiments.

After mere propensities follows another kind of faculties, which I call sentiments. Each of these joins to a propensity an emotion, or feeling, of a specific kind. Several of them are common to man and animals, others are proper to man. I shall first consider the former, which I also entitle the inferior sentiments.

X. *Organ of Self-esteem.*

Self-esteem is one of the faculties generally attributed to external circumstances; but its activity is so very great and universal that I am astonished no one has heretofore thought of a special organ on which its manifestations might depend. Great pride is observed in individuals who have no pretensions to influence over others, either by birth, fortune, or personal talents; whilst many who enjoy these advantages are remarkable for the modesty and humility of their deportment. Poor, ignorant, and pitiful creatures have sometimes the greatest opinion of their own personal importance; and children may frequently be found who are fond of showing superiority. In every community we find leaders and followers; the fall of mankind is ascribed to pride; no profession has ever been free from its influence; even teachers of humility have too often shown pride in all their actions. By the influence of self-esteem, individuals and whole nations think themselves superior to all the world besides; they know every thing best, and their sanction seems to them of the utmost importance.

Self-esteem is more common in men than in women; boys frequently place their judgment above that of others, while girls always look for the approbation of those who surround them. Moreover this sentiment is often deranged, and many lunatics think themselves ministers, kings, and emperors, or even the Supreme Being; and there are a greater number of men than of women alienated by pride.

A feeling similar to the pride of man seems to exist in certain animals, as in the turkey-cock, peacock, and horse.

Dr. Gall thinks that the organ of self-esteem is the same as that of the faculty which makes animals dwell upon mountains and elevated places; hence he calls it the organ of haughtiness, meaning to designate at once physical and moral height. In speaking of the organ of inhabitiveness, I have given the reasons which induce me to differ from him, and have in a former page said that I conceive one faculty necessary to produce the propensity to determinate inhabitation, and another to cause the sentiment of which I now treat.

Dr. Gall's attention was first drawn to the sentiment of pride, from having examined the head of a beggar, the middle of the upper and back part of which presented an elevation he had not observed before. Having asked the man the cause of his mendicity, he was astonished to hear him accuse his pride as the origin of his miserable condition. He had conceived such a high notion of his own importance as to believe himself infinitely above learning a trade or profession. Thus, incapable of earning a livelihood, begging was his only resource to save himself from starvation.

We have such a number of observations confirmatory of this organ, in individuals in both sexes, in whole nations, and in disease, that we consider it as established.

What then is its fundamental power? The word pride, although the sentiment commonly manifests itself in a way that would warrant the name, is still too harsh, and would indicate a degree of activity which produces many disorders. Christian

morality warns us against pride and presumptuous conduct, and inculcates humility and meekness. It would therefore be improper to adopt the characteristic sign of an abuse as the title of a primitive power. This sentiment seems to give us a great opinion of ourselves, constituting self-love or self-esteem. Too active, it produces pride, haughtiness, disdain, contempt, presumption, arrogance, and insolence. A moderate dose of it gives dignity and nobleness to the character, and secures against low-mindedness; but I do not believe Dr. Gall is right when he says*, modesty and lowness of mind result from insufficient developement of this organ. I think a person may be proud and basely-minded at the same time. Real lowness of mind supposes a deficiency of the sentiment of justice; for a person who is both proud and just will never be guilty of a mean action. Modesty also does not result solely from the absence of pride; this condition only permits the moral sentiments and cautiousness to act in a certain way, to which the title "modesty" is applied. These ideas, however, can only be clear to those who are acquainted with the fundamental powers of the mind, and the effects of their mutual influence.

On the other hand, nobleness of character is not the result of self-esteem alone. *Noble* or *notable* primitively meant the being remarkable in any way. I heartily desire to see this name given to those who excel by their *superior* qualities. The signification, however, of that which is superior, both as regards qualities and actions, varies exceedingly. Among warlike nations personal courage is one of the first and most valuable qualities, and conquerors and those who contend for absolute power accord to their soldiers and companions in arms all the principal distinctions. They are praised and called nobles; they form a congregation, and their nobleness consists in qualities which favour the personal views of their leader.

History shows us that this spirit prevailed more or less

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* Edition in 4to. t. III. p. 322.

among ancient nations, and that it has always had a principal influence during ages of barbarism. Among the Romans many occupations, although indispensable to life, were considered as ignoble and unbecoming in a soldier. Warriors have generally understood better than the members of any other profession how to secure the first rank in society; they have always been the most powerful, and have used their strength to further their own advantage. The priesthood also succeeded at an early period in acquiring distinction and nobility, as dispensators of eternal happiness, and as administrators of the divine legislation. Wealth, though it gives great influence in society, has never been considered as sufficient of itself to confer nobility on its possessor, but the rich have been permitted to purchase titles of nobility.

Ideas upon nobleness having gradually become sounder and sounder, we can now say that the nature of all men is essentially the same; that each individual differs from his fellow only in the degree of talents and feelings he possesses; and that it is a duty incumbent on every one to contribute to the general welfare and common happiness. Individuals are in reality noble in proportion as they fulfil this duty. Now, since distinctions should be conferred on the score of superior qualities alone, it follows that they are to be personal, and not attached as hereditary rights to certain families. If it be unjust to punish children for the crimes of their parents, I see no reason why unworthy children should be rewarded for the merits of their ancestors. Let every one reap the fruits of his own labour, and enjoy as far as he is deserving. To confer any hereditary privilege is to do an injustice to posterity. I admit, it is true, mental dispositions, under certain conditions, to be hereditary; as these conditions, however, have hitherto been neglected, and are not likely to be observed for some time to come, I cannot help saying that it is improper to permit degenerate children to enjoy privileges which parents received as rewards of talent or virtue.

In the actual state of society, I do not find it reasonable to confer similar marks of distinction upon soldiers, clergymen, artists, legislators, and every modification of characters and talents, since the services rendered by each to mankind are not equal. The merits of a moral teacher and of a soldier who aids a conqueror in his views, are, in my opinion, very different.

XI. *Organ of the Love of Approbation.*

Vanity is natural to mankind, and in comparison with its frequency, Dr. Gall thinks pride a scarcity. Children even when very young are fond of approbation; emulation stimulates the youth to exertion; few adults are insensible to the voice of applause; and multitudes governed by the feeling of ambition, sacrifice to it quiet, sleep, health and even life.

Observation proves that this sentiment is more powerfully felt by women than by men; the earliest infancy betrays the difference. Certain nations also are governed by it more than others. Montesquieu considered it as the true pivot of the French government. Its derangement is a frequent symptom of insanity. Finally, it exists in many animals, as in the horse, dog, cat, &c., for they are fond of being caressed and flattered.

Dr. Gall discovered the organ of this sentiment whilst engaged in examining that of pride. Having met with an insane woman who thought herself queen of France, he was disappointed in his expectation of finding a large organ of pride. He, therefore, turned his attention to the rest of the head, and saw that the parts on each side of it were very prominent. He then reflected on the behaviour of the insane from pride and from vanity: the former, imperious, arrogant, and fond of commanding; the latter, polite, affable, and courteous, comporting themselves in a manner evidently indicating a wish to please; and soon learnt to separate the action and indication of each of

these sentiments. Having afterwards examined the heads of several individuals known for their ambition, and found a configuration similar to that of the insane woman, he began to speak of an organ of ambition, and of vanity. Is this its fundamental faculty?

"The sentiment of self-esteem, vanity, and ambition," says Dr. Gall*, "is fundamental." He quotes and admits the opinion of Count Segur, according to which there is no nation without vanity, which is the cause of the mutual hatred of nations. Thus he evidently confounds pride with vanity.

I regard self-esteem as the basis of pride, a sentiment manifested by the organ last spoken of, while the faculty I now consider looks for the approbation of others, whether deserved or not, whether in a good or in a bad cause. It makes us attentive to the opinion entertained of us, and induces the question, what will the world or the people say? It is fond of approbation in general, without attending to the manner of acquiring it, and may therefore be directed to objects of the highest importance, as well as to such as are of no moment, or even hurtful. Its sphere of activity is very extensive; for it is sensible to caresses and flattery, to compliments, to applause and to glory; it wishes to be distinguished and honoured, and men endowed with it make use of many and various means to attract attention. They dress fashionably, and resort to ostentation of all kinds; they look for decorations, titles, and other worldly distinctions. Ambition is the distinguishing epithet of its agency, if the object aspired to be of great importance; vanity, if claim be laid to distinction on the score of trifles. Its activity extends through all ranks of society. The general who leads back a victorious army is elated with the applause of his nation, and the slave is delighted, if the manner in which he has performed his task be approved.

This fundamental power is essential to society, but its too

* Tome III. p. 326 and 328.

great activity causes many abuses. It favours industry, but also introduces luxury; it produces polite manners, but is the mortal enemy of personal liberty. Nations who possess it in an eminent degree are scarcely fit for a free government.

The organ of the love of approbation is established by innumerable observations. Being much developed, it generally elongates the posterior and upper part of the head (*Pl.* V. *fig.* 1 and 2, xi.) Sometimes, however, it is more spread out on either side, and then the head is widened rather than elongated.

The name I propose for the organ, according to its special faculty, is love of notoriousness, or of approbation.

XII. *Organ of Cautiousness.*

We often meet with individuals who are naturally timid, fearful, undecided in their opinions, and incapable of taking a resolution; while we see others who act without hesitation, and instantly obey every internal impulse without timidity or fear. Many children are very timorous, and easily affrighted by the presence of strangers. Women and females in general are more timid and careful than men and males. Whole nations also are remarkable for wariness and circumspection, whilst others are noted for their levity and carelessness of disposition. The Scotch and Irish offer excellent instances of this difference of character. Insane persons are sometimes exceedingly timid and are terrified without any assignable reason. Finally, whole species, and individuals of the same species of animals, differ in degrees of shyness and circumspection. Such a peculiar feeling then must be considered as fundamental. Now what is the special faculty? Dr. Gall* says that "man and animals were necessarily endowed with a faculty which should induce them to look forward to coming events and avoid danger. Without such a disposition, they would have been incapable of taking any measure for the future." He calls the faculty that prompts

* Tome III. p. 332.

these actions *foresight*. Now I do not believe that it foresees; it is, in my opinion, blind and without reflection, though it may excite the reflective faculties. It incites us to take precautions; it doubts, says *but*, and continually exclaims, *take care*. When too active, it causes such abuses as uncertainty, inquietude, anxiety, irresolution, melancholy, and hypochondriasis.

The organ of this sentiment is established, and its place is indicated on the upper, lateral, and posterior part of the head, towards the middle of the parietal bones. (*Pl.* v. *fig.* 2. xii.) Two persons at Vienna, remarkable for their irresolute characters, were one day in a public place; Dr. Gall stood behind them and observed the shape of their heads; he found them extremely prominent and large at the place I have just indicated. This observation gave him the first idea of this organ, which was soon afterwards established in men and animals. The form of the heads of circumspect persons, and of those who are rash and incautious, is very different. Shy and circumspect animals also, as the stag, roe, pole-cat, otter, mole, and those which place sentinels, as the chamois, crane, starling and bustard, have the cerebral parts just mentioned greatly developed. These animals certainly have not understanding enough to induce us to think that their habit of placing sentinels is the result of reflection. We should rather say that such an act may be commanded by nature by means of some peculiar organic arrangement. Moreover, animals which see in daylight, but which do not dare to seek their food except during the night, have the upper and posterior lateral parts of their heads more developed than those which go out during the day. The skull of the eagle is very different, in the above-named situation, from that of the horned owl, which sees during both the day and night.

When treating of the organ of *Combativeness*, I mentioned that anxiety and fear could not arise from a want of courage but must be positive affections of some primitive feeling. They result, in my opinion, from a modified state of circumspection.

We may suppose, nevertheless, that any one destitute of combativeness will be overcome by cautiousness sooner than another who feels a great propensity to fight. Deficiency of cautiousness, on the contrary, modifies the action of the other faculties, in so far as they are allowed to act according to their own natures, without restraint from any feeling of timidity.

The diseased state of the organ of cautiousness is very common, and predisposes to suicide. Many considerations on this point may be found in my work on Insanity.

At the end of the article on the organ of cautiousness, Dr. Gall speaks, as he expresses himself, of *negative* qualities. He examines and endeavours to refute my manner of explaining fear. Let us see his arguments: he begins by defining what he calls *negative qualities*, viz., qualities which are results not of the action, but of the insufficient action or total inactivity of any fundamental power. Amongst other things he says, "if fear be not the result of the want of courage, what are the faculties which may inspire aversion and even horror for women, if not the want of physical love; aversion for music, if not the want of the musical talent; erroneous judgment, if not the defect of intellect; aversion for food, if not the defect of appetite?" "How can Mr. Spurzheim," he asks, "conceive hatred, calumny, cruelty, or imbecility, since there is no fundamental power for either hatred, calumny, cruelty, or imbecility?"

Dr. Gall, in this essay on negative qualities, takes no notice of my ideas on the affections of the fundamental powers; he then confounds ideas which are common, with ideas which are peculiar to each of us; moreover he does not separate the phenomena from their explanation; this, however, is necessary, since we often admit the same fact and differ in its explanation. To refute my opinion on fear, he recurs to analogies, but evidently confounds the result of certain faculties being inactive with some of their positive affections, with their imperfect and deranged actions, and with sensations which arise from exhaustion of the powers. These notions then must be separated,

and the mutual influence of the special faculties considered, in order to clear up the point at issue.

After having stated that there is no fundamental power for hatred, calumny, cruelty, or imbecility, Dr. Gall continues to say: "I myself easily conceive these phenomena. External objects procure us pleasure only in so far as there exist points of contact between them and the cerebral organization. If this contact ceases to exist, the external objects are no longer in harmony with our faculties; disinclination and aversion succeed. Who has not felt that a surfeit of certain enjoyments produces indifference, or even real disgust for what had before been desired most ardently? In the same way, if our limbs are exhausted by fatigue, we feel aversion for walking."

I admit with him and many others the relations between the internal faculties and external objects, and I take up these considerations in the philosophical part. There I explain my opinion on pleasure and pain, considering them as general affections; for every faculty being active desires, and being satisfied or agreeably affected procures pleasure; not being satisfied or disagreeably affected, it gives pain. Thus each fundamental faculty can excite pleasure or pain, and both in different degrees.

Dr. Gall merely states that there is no organ for hatred, calumny, cruelty or imbecility, and does not indicate the cerebral organs on which these phenomena depend. Before I explain my ideas upon this particular, I shall examine our opinion on fear, as they have occasioned this discussion.

I consider *fear* as an affection of the sense of circumspection. Dr. Gall replies that "cowardice *(poltronerie)* is always passive, but fear sometimes negative and sometimes positive, and that the most courageous person feels fear, if he finds himself exposed to a danger above his powers." "If we say," continues he, "that a man or an animal is afraid, we do not always mean to say that they are affected with fear in the same way as one is affected with anger. The expression often means that a man or an

animal is a poltroon or a coward. And in this case they are possessed with fear more easily than if they were courageous." "Numerous armies," says he, at the end of the article, "composed of men remarkable for their courage, have had fits of fear. Did not the intrepid Roman sacrifice to Fear?"

Let us suppose that the two expressions, to be a coward and to feel fear, are synonymous, still I neither see that we can therefore infer that fear is negative, nor that the knowledge of danger and the sensation of fear take place in the same faculty. I, however, conceive that the knowledge of any danger may affect the sense of circumspection in a manner to which the name fear is applied, just as it may excite courage and make a person fight with fury. Neither courage nor circumspection know the danger nor reflect on it. Sometimes the most innocent and harmless things inspire fear.

"If circumspection," says Dr. Gall, "were the source of fear, careless beings ought always to be free from this feeling; and one should be the more fearful the more circumspect one is—circumstances which we do not find confirmed by experience."

Even the most careless of beings is not entirely destitute of circumspection; and other faculties, such as adhesiveness, love of approbation, self-love, and reflection, may excite the little dose of circumspection that exists in such a manner as to produce fear. Moreover, any one endowed with courage, self-esteem, acquisitiveness, and firmness, even if his circumspection be considerable, will feel less fear than another with smaller circumspection, and deficient courage, self-love, and firmness. The reader must also bear in mind the meaning which I attach to the term affection, and remember that affections do not depend only on the different degrees of activity of the faculties; that the sense of touch, for instance, though obtuse, produces the sensation of itching; and that, in the same way, fear is an affection of quality of circumspection. Moreover, the intrepid Roman who sacrificed to Fear was not, could not be,

entirely deprived of circumspection; and in personifying fear, the ancients brought sacrifices to its shrine, in order to secure themselves from its dangerous influence, and to turn the divinity against their enemies.

I said, that if fear resulted from the absence of courage, I could not understand how the same person or animal might feel fear and courage at the same time. Dr. Gall replied, by asking, why I here neglect the principle upon which, on other occasions, I insist strongly, *viz.* that the actions are seldom the result of a single organ? This question, however, is inconceivable to me, since I explain, by means of the simultaneous action of circumspection and courage, the possibility of feeling fear and courage at the same time. The same principle readily explains several phenomena which Dr. Gall merely mentions.

Let us still examine whether the analogies, quoted by Dr. Gall, refute my opinion on the origin of fear. He compares fear with fatigue, disgust, and other sensations, which result from the satisfaction and exhaustion of certain faculties. Will he then maintain that fear is ever the result of courage when exhausted? He compares it also with the inactivity of faculties, with imbecility, and with the imperfect functions of the intellectual faculties or false judgments. None of these comparisons, except that with imbecility, is conformable to the definition given by Dr. Gall of negative qualities, among which he includes fear, hatred, calumny, and cruelty. Several persons are fond of reasoning, but their conclusions are false; others are fond of singing, and of making melodies, but cannot produce harmony. Erroneous reasoning, however, is by no means an effect of the inactive state of the intellectual faculties. Hatred does not seem to me the consequence of the inactive or exhausted state of any faculty. He who has little benevolence and the other moral feelings inactive, whilst his self-esteem, his desire to acquire, and feelings of an inferior order, act with energy, will hate all who oppose his personal views.

Even he who has attachment, justice, and benevolence, and at the same time self-esteem, may hate a person who forgets his duties to others, and is guided by selfishness alone. Justice and attachment when offended may increase or excite indignation and hatred ; but these affections always reside in feelings of an inferior order. It is the same with calumny. No one will speak ill of others because he is fatigued with praising them. But selfishness, self-love, and the love of approbation, when offended and not guided by justice, may feel pleasure in calumniating.

Finally, cruelty never results from the inactivity, or exhaustion, or fatigue of benevolence. Benevolence, when active, always prevents cruelty, but when inactive, other feelings, destructiveness for instance, encouraged by self-love, firmness and selfish motives generally, may act in a cruel manner.

Thus all Dr. Gall's statements in refutation of mine, and in support of his own opinion in regard to the origin of fear, are rather for than against me. I therefore continue to think that fear is an affection of the feeling of circumspection, and not a result of the inactivity of courage, or of courage satisfied or exhausted.

In the fourth volume of the octavo edition, published in 1823, Dr. Gall has once more taken up our discussion on fear. He replies to my opinion, and to that of Dr. Demangeon. I shall here answer him, only however in as far as my own is concerned.

Dr. Gall first states, that I am wrong in supposing that the expressions *avoir peur* and *être poltron* are synonymous. He however had used them as synonymous*, and instead of reproaching him with his incorrect French, I merely said, *in sup-*

* "Quand on dit," says he, tom. iii. of the editions in folio and quarto, "qu'un homme ou un animal a peur, on ne veut pas toujours dire par là que, dans ce moment, il est affecté de la peur, comme on est affecté de la colère ou de la frayeur. On entend dire, par cette expression, que c'est un homme ou animal peureux, poltron."

posing that these two expressions were synonymous, I intended to discuss ideas only, and not words, particularly as the French was a foreign language to myself as to him. This short explanation may suffice to rectify Dr. Gall's accusation.

Moreover, he retracts the analogies and his reasoning on them, declares fear to be an affection of courage, and says that he employed analogy only to make himself clearer in his ideas on negative qualities. I allow this to be, but I still continue to oppose him in admitting that fear is sometimes negative. To the notion of this sort of fear my answer remains the same. I therefore only examine whence *positive* fear arises. Dr. Gall considers it as an affection of the organ of courage, and not as the result of circumspection. He supports his opinion, by asserting that fear is not in proportion to circumspection. Why has he not attended to my answer to this argument, viz. that I do not consider fear as an affection of quantity, but of quality of circumspection? According to his manner of arguing, fear increases in proportion as courage diminishes, and is evidently always a negative quality. Thus Dr. Gall has elicited no new argument which obliges me to change my opinion, and our discussion on fear remains exactly where it was, before his last publication.

Genus III. Of the Affective Faculties.

Superior Sentiments.

I have now gone over the affective faculties and their respective organs which are common to man and animals; and even here, in this purely animal portion of his nature, man is the most perfect of all beings. He alone possesses all the faculties which are but sparingly distributed through many different tribes of animals; besides, every faculty is susceptible of many more modifications, and of greater energy in man than in animals. Hitherto, however, we have studied man only as an animal. His pride, vanity, selfishness, and other inferior feel-

ings, we have seen, are the causes of innumerable disorders; the addition of certain superior faculties was therefore necessary to establish his moral character. And here it is important to recollect, that no feeling either of an inferior or superior nature results from intellect. Anatomy and Physiology confirm this truth. It is also important to specify the moral feelings, and to inquire how far they operate amongst animals. One of them cannot be entirely denied to brutes; for this reason I shall begin with it.

XIII. *Organ of Benevolence.*

Philosophers frequently ask, Is man by nature good or bad? Both opinions find supporters, and both have opponents. The answer is not so very difficult as has been imagined. Men are not born alike in this respect. Many children are good-hearted, benevolent, and sensible to the sufferings of others. Common people, without education, often display a great deal of benevolence and sympathy. Some individuals find their chief source of delight in doing acts of charity. St. Vincent de Paul offered to bear the chains of a criminal, in order to restore him to his wife and children, who suffered the extreme of misery and distress. Individuals who devote their lives to the relief and consolation of the wretched are to be found in great numbers.

On the other hand, we see children complete egotists, and entirely thoughtless of others; many arrived at mature age think of themselves alone, and benevolence towards their fellow is known to them merely by the name. Some tribes, and even whole nations, are mild and peaceable, whilst others are warlike and cruel. The Hindoos and Caribs are remarkable and well-known instances of the extremes of goodness and cruelty.

Derangement of benevolence is occasionally a symptom in insanity. It is sometimes too active, and in other cases not active enough.

Benevolence, as an innate feeling, may also be proved by a reference to animals, and by comparing the natural dispositions either of various kinds, or of different individuals of the same species. Several kinds are naturally meek, as the roe and sheep; others are wild and mischievous, as the chamois and tiger. Some dogs, horses, cows, &c., are meek and familiar, while others are fierce and bad tempered.

There are examples on record where animals have shown high degrees of benevolence to others and even to man. A respectable family of Paris told me that they had a horse and a cow living together in the same stable; that the horse several times got untied, went to the corner where the sack of oats stood and drew it in his teeth near the cow, probably to make her partake of the good cheer. Many dogs also exhibit the same feeling. Dupont de Nemours saw a swallow caught by one foot in the noose of a packthread attached to the roof of the French Institute at Paris. The prisoner screamed, and attracted all the swallows of the neighbourhood. After a long and tumultuous consultation, a great number formed a line, one after another darted at the packthread with their bills, and in half an hour delivered the captive.

From the preceding observations it results, that benevolence is an innate and particular faculty, and by no means the effect of external circumstances, as some have supposed, still less of the deficiency of courage; since it is certain that many quarrelsome persons are good-hearted, and timid and cowardly individuals often mischievous and cruel.

It was some time before Dr. Gall thought of looking for goodness of heart in the brain. The servant of a certain family at Vienna, with which the Doctor was intimate, having been frequently praised for benevolent and kind dispositions, he at last moulded the man's head in plaster. Observing a considerable protuberance on the superior and middle part of the frontal bone, just where the hair begins to grow, he set

down the occurrence as worthy of further attention, and having subsequently examined the heads of a great number of benevolent and kind people, the function of the cerebral part in the above situation was speedily confirmed.

It is interesting to remark that, among the antiques, the head of Seneca, in the seat of the organ of benevolence, is much higher than that of Nero. The same striking difference may be seen by comparing good portraits of Malsherbe and Danton.

Good natured animals have also the part corresponding to the organ of benevolence in man elevated and prominent. (*Pl.* VII. *fig.* 1 and 3, xiii.) Such as are vicious and bad tempered have, on the contrary, the same place flat or hollow. (*Pl.* VII. *fig.* 2 and 4, xiii.)

Dr. Gall considers benevolence, justice, the sense of morality and of conscience, as belonging to one and the same fundamental power. He first makes some general reflections, and then, comparing the moral sense with benevolence, thinks himself authorized to conclude that benevolence is only a higher degree of its activity. He also considers conscience as a modification of benevolence. He shows that that feeling does not depend on social intercourse; and allows it necessary to determine by laws what shall be just and what shall be unjust, that is, to establish an arbitrary conscience. "Man," says he, "nevertheless, being destined to live in society, requires the sense of morality; without it no association, no family, no nation, can be united*."

According to this hypothesis, all social animals, as the sheep, duck, cow, horse, &c., ought to possess the moral sense. This, however, is not the case. There is also no proportion between the moral sense and benevolence. Many who have the organ of benevolence much developed possess very little of the feeling of justice. I agree with Dr. Gall, and many other

* Tome iv. of the editions in fol. and quarto.

philosophers, upon the innateness of the moral sense; but I do not think that the sentiment of justice is the same as that of benevolence. I support my opinion by the arguments which prove the plurality of the faculties; I also acknowledge the necessity of positive laws, but cannot assent to the explanation given by Dr. Gall of conscience; for we see many animals endowed with benevolence which never demonstrate the feeling of repentance.

Such are the considerations which induce me to admit a sense of morality independent of reason and different from benevolence. This latter is itself a fundamental power, producing mildness and goodness and a long catalogue of modified actions variously styled: benignity, clemency, mercifulness, compassion, kindness, humanity, cordiality, urbanity, hospitality, philanthropy, the love of our neighbour, and charity.

Cruelty, being a positive sensation, cannot be the consequence of the want of benevolence, as Dr. Gall supposes. Goodness of heart cannot exist in those cruel beings who delight in tormenting others; but active cruelty belongs to the organ of destructiveness unrestrained by the superior powers. Another opinion of Dr. Gall, of which I cannot approve, is, that benevolence may degenerate into bad temper, and into the propensity to rejoice in the evil that happens to others, in the same way as the sense of taste may degenerate into disgust at food, physical love into aversion to the other sex, and the sense of melody to aversion to music. The inactivity of benevolence, or its exhausted state, may produce indifference to its functions, and make us avoid any opportunity of doing beneficent actions; but active wickedness, and pleasure in the pains of others, like cruelty, depend on inferior feelings, unaccompanied by superior sentiments.

XIV. *Organ of Veneration.*

Dr. Gall formerly considered morality and religion as one; but he now assigns benevolence and morality to one organ, and the knowledge of God and religion to another. I am certain that religious feelings depend on several faculties, and also that our actions may have a moral character independently of all religious ideas; at the same time, I admit that moral and religious feelings may be conjoined and appear together.

Let us first examine whether mankind is religious by nature. Some churchmen would persuade the credulous that preaching and religious instruction alone produce sentiments of religion. The ancient philosophers, on the contrary, believed and taught that man was religious by nature. Plutarch observed that there was neither town nor village in the world without a god. Aristotle, Plato, Cicero, Seneca, and many others have made the same remark, and the fathers of the Christian church themselves have commented on this truth, in order to prove that the belief in a God was innate.

The innateness of religion is not only proved by its universality among mankind, but also by the sameness of the ideas which prevail on all essential points of belief. It is with religion as with the principles of all the fundamental powers;—they are the same at all times under every variety of circumstance. The laws of music and of painting are universally and invariably the same, and in every religion there is something venerated, whether it be a log, a stone, or a star; the God of the Jews, or the benevolent Deity of the Christians.

To this it is objected that the Supreme Being has revealed his will from time to time, and that religious ideas have been preserved by tradition. But religion existed before the time of the Jews, and even since they appeared as a distinct people their revelation has been limited to themselves, and other nations

have not ceased to have creeds entirely different. There are many nations who never received the revelation either of the Jews or the Christians, and who still manifest religious sentiments and have peculiar forms of worship. It must even be granted that as man was destined to have a revelation, he was also necessarily made capable of receiving it. Who would attempt to make any animal inferior to man acquainted with revelation? It is a general law that neither man nor animals can be instructed unless endowed with the individual faculty which appreciates the peculiar sort of knowledge conveyed. Dogs do not learn religion any more than music. Revelation, then, can only have regulated the religious sentiments which existed previously to its annunciation, and I think, with Bishop Butler*, that *Christianity is a republication of natural religion in its genuine simplicity.*

I hope the preceding considerations will prove, to every unbiassed mind, that sentiments of religion are inherent in the nature of man, that they are part of the plan of creation, and that the human kind will never exist without them. Let us only add, that their manifestations depend on a certain organization of the brain. This fact then puts an end to all discussions as to the necessity of religion. If religion depend on a portion of the brain, its necessity is established, and the certainty that it can never be neglected as one among the institutions of society proclaimed. Phrenology does not exclude the idea of revelation; but it relies on the principle that the same God who made the world, and revealed the true religion, could not be in contradiction with himself at different periods, could give no command in opposition to nature, and therefore prepared the brain in relation to his revealed will.

Dr. Gall, viewing the actions of man, and considering the vast variety of characters in the world, observed a great

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* Analogy of Religion.

difference upon the point of religion. Some are eminently devout, and pray with great fervour; others pay very little attention to acts and forms of religion. In examining the head in relation to this difference among individuals, he found that the very pious were frequently bald; it was evident, however, that baldness could not cause devotion; for every bald man is not pious, and women, though they do not grow bald, are in general devout. He then saw that the heads of pious people were very elevated. (*Pl.* VIII. *fig.* 1, xiv.) Lavater had already made the same observation.

Priests who have chosen the ecclesiastical state from natural inclination, and those who have entered it influenced by circumstances or peculiar motives, as well as religious and irreligious persons, present very different configurations of the upper part of the head.

The best artists would seem to have felt the influence of an elevated head; for they have always given this form to their pictures of saints, of holy personages, and particularly of Christ. We cannot flatter ourselves with having the true portrait of Jesus Christ, but it would be interesting to inquire whether painters have composed such representations as we possess, guided by an internal impulse, or from having observed devout and benevolent men, in the same way as the ancient artists sculptured Jupiter with the forehead of a mighty genius.

Observation, then, shows that persons naturally devout have very elevated heads, and Dr. Gall assigns the feeling to the cerebral part immediately behind the organ of benevolence; this he formerly called the organ of theosophy. The name he adopted from Lavater, who speaks of a configuration of theosophy; but it is certainly incorrect, since we cannot flatter ourselves that we know God; we can only form notions of the Deity according to our own nature; we *anthropomorphise* and attribute to him all the superior faculties of man in their highest state of perfection; but who would venture to say that the Supreme Being

does not possess many other faculties of which we have not the slightest notion? We can speak only of a Supreme Being, without determining his nature. To understand his nature we ought to be his equals. History also shows that the sentiment of devotion has neither revealed the nature of God nor the number of divinities. The ancients adored many gods and goddesses; and, since the unity of God was believed, he has been represented as endowed with very different qualities.

Dr. Gall now calls the organ of that sentiment manifested in devotion the organ of God and religion. He thinks that it proves the existence of God, and says, "as every other faculty of man and animals has an object which it may accomplish, it is not possible that while there is an organ of religion God should not exist; hence, God exists."

This faculty, however, is a sentiment; it is blind, and does not reveal the existence of any object. I admit that devout persons have elevated heads; but not every one who possesses the cerebral part in question large is devout and religious. In all the busts and portraits of Voltaire it is represented as much developed; and certainly he was not religious. I have also found the organ very considerable in an individual who assured me that he did not believe in the existence of God. Man, in my opinion, arrived at the belief in a Supreme Being by means of his reflective faculties. Dr. Gall first observed this organ in individuals in the act of adoring God and saints; and my observations induce me to consider its special faculty as the sentiment of veneration. By its agency man adores God, venerates saints, and respects persons and things. What indeed can be more natural than to venenerate the Being who is considered as the cause of all things? I have already appealed to the history of the ancients, who admitted a greater or less number of gods; and, without going so far back, we may take at the present time nations and individuals, who have all different ideas of God, according to their creeds and intellectual

faculties, in proof of my position that this faculty does not determine the object to be venerated, nor the manner of venerating.

The sentiment of veneration, though essential to religion, does not include the whole of the ideas comprised in that name; it only occasions the part called worshipping. Its determinate actions depend on its combinations with other faculties, and on the direction it has received from education; by far the greater number of persons do what they are taught to believe agreeable to God. One sings psalms, another repeats ten or twenty or more times the same form of prayer; one eats vegetables, another burns candles, &c., and all this to the glory of God. This faculty, then, not being confined to devotion or religious veneration, but being the cause of veneration or respect in general, must be named accordingly.

The functions of this sentiment are at one time moral and at another religious; combined with benevolence and justice, it desires truth and contributes to the happiness of others; separated from these feelings, however, and united with selfishness, self-esteem, destructiveness, and the religious sentiments which I shall examine hereafter, it may do great harm to humanity, though its tendency be eminently religious.

It seems to me of the highest importance to specify the difference between religion and morality, and to determine the fundamental faculties on which each depends. Christianity is, at once, religious and moral; in other words, it consists of two parts, the doctrine of faith, and that of works. It is religious in as far as it teaches the existence of God and his revealed will; it is moral when it commands charity and justice. There are persons who fancy themselves very pious and religious when they say that they believe in revelation, that they go to church regularly, and follow up all the rites and ceremonies prescribed; but who, nevertheless, are very selfish and uncharitable. Nay, there are some who hope for salvation through faith alone without doing any good works. Now, in

this sense, an atheist may be moral, and the believer in divine revelation immoral. Let us then examine the special moral as well as religious faculties.

Benevolence is the first moral quality, or essential rule of moral conduct. Veneration, in the sense I adopt the name, is also moral on many occasions, though its influence is likewise great on religious manifestations; I shall speak first of the remaining sentiments which belong to morality, and then of those which complete religion.

XV. *Organ of Firmness.*

A peculiar natural sentiment, that varies in individuals and nations, is frequently exhibited in our intercourse with mankind. Some children yield readily, others are obstinate and stubborn. Some grown-up persons, also, can scarcely be said to have a will of their own; they follow the last impulse they receive, and, without strength to resist, are the easy instruments of all whom they meet. Others are of an immovable character, firm in their resolutions, and constant in their principles; they do not attend to exhortations nor to examples; their conduct is uniform, and their exertions may be calculated on in the various situations of life.

Lavater observed that persons endowed with perseverance and firmness had the top of their heads very much developed. Dr. Gall made the same remark, and so many facts bearing on this point have been collected, that we now consider the organ of this sentiment as established. (*Pl.* V. and *Pl.* VI. *fig.* 2, xv.)

It is not easy to define the feeling accurately which inheres in the part just pointed out. Its effects are often called will; but will, in the true sense, is rather the result of reflection than of any of the propensities or sentiments. It is true that persons endowed with this feeling in a high degree constantly say, *I will;* but they employ *I will* in the same way and with the same signification as is expressed by the words, I want, I

desire, I insist upon, I command. The faculty here spoken of gives constancy and perseverance to the other powers, contributing to maintain their activity. Its applications bear different names, as they emanate from its combination with other faculties, and relate to the situation of the individuals in whom it is active. He who has firmness combined with pride, ambition, and selfishness, does not willingly obey others, but is himself fond of commanding; whilst he who is firm in his decision, but just and benevolent at the same time, seeks for independence, claims equal rights with every member of the community, and requires the same duties of all. The influence of the faculty is always great, as well when the individual is well as when he is ill disposed, that is, according as it is combined with the superior or inferior feelings.

Being too active, it produces many disorders, such as infatuation, stubbornness, obstinacy, and disobedience; it is also one of the causes of mutiny and sedition; its insufficiency leaves the other faculties to take the lead, and renders men inconstant, changeable, and yielding to circumstances.

The existence of the organ and faculty has been established by a great multitude of observations. The seat of the organ has already been indicated; it is in the midst of the other feelings, and seems to strengthen their general activity.

XVI. *Organ of Conscientiousness.*

The manifestations of a feeling of justice and conscientiousness are eminently deserving of attention in the study of mankind. Many jurisconsults, and other persons connected with the law, think that positive legislation is the source of justice, whilst the sentiment of justice, in reality, precedes legislation and is its cause. Those are also wrong who maintain that revealed religion has produced the feeling of justice or righteousness. But, before proceeding farther, let us dis-

tinguish two significations of the word justice. It means the innate faculty which views all actions in the point of right or wrong, and it indicates determinate actions as being just or unjust. Revealed religion and civil legislation determine that which is positively just or unjust; but it must be ascertained whether there is a fundamental sentiment which disposes mankind to look and to wish for justice.

In speaking of benevolence, I have shown that Dr. Gall confounds this primitive sentiment with that of justice. We however differ only in our explanations of the phenomena of morality, he ascribing them all to a single faculty, and I admitting two different sentiments, one of benevolence and another of conscientiousness. In the same manner he considers the notions of man on the existence of God and of religion as the result of one faculty, whilst I think that several feelings, each dependent on a special organ, are concerned in producing his religious ideas.

It is certain that the feeling of duty or conscientiousness is not equally strong in all men. Children, before they have received any education, are very different in this respect. Some pay no attention to representations on the point of justice, others listen to them with pleasure. Among adults some have an internal monitor which constantly advises them of their duties, and without having the law they do that which the law prescribes. Those, however, who think that this internal monitor or primitive feeling is the best guide of innocence, and the sure punisher of those who act in opposition to its dictates, are greatly mistaken; for it is quite obvious that the natural feeling of conscientiousness is very weak in many individuals, and that the law or the regulations of a watchful police are indispensably necessary to keep them in order. It is, indeed, generally known that he who is dragged into criminal acts by very strong internal propensities, unbalanced by the feeling of justice, rarely feels compunction for his misdeeds, or repents sincerely. The brute inclinations constitute, if I may so ex-

press myself, his principal character, and all the actions which result from them are in harmony with his inclinations.

This fatal truth, though it may displease those who dream of nothing but the dignity of human nature, is nevertheless proved by observation, and is conformable to Christianity. "A good tree," said Jesus Christ,* "cannot bring forth evil fruit, neither can a corrupt tree bring forth good fruit."—"The natural man," says the Apostle Paul,† "receives not the things of the Spirit of God, for they are foolishness unto him, neither can he know them, because they are spiritually discerned."—Cardinal Polignac speaks ‡ of men who are born wicked, and to whom crime is delightful.—"Why should a criminal," he asks, "who does not consider himself wicked, repent?" Indeed, the greatest criminals do not commonly think themselves guilty, and therefore cannot repent. Some of them with incredible stubbornness deny the most satisfactory proofs of their guilt, and audaciously insult those who bear witness against them; others, with impudent sincerity, relate a series of horrible trespasses, and find a subject of merriment in such crimes as make humanity shudder. Mr. Bruggmanns, at Leyden, showed us the skull of a robber chief who had precipitated different persons into the canals, only to have the pleasure of seeing them struggling in the agonies of death. On his trial this wretch said:—"What will you do with me—am I not an honest man?"—We saw a girl at Munster who had assisted her mother to kill her father, and who did not manifest the slightest repentance. If her crime was spoken of she only shrugged her shoulders. In short, the reports of the trials of almost all inveterate criminals justify the observation that there are certain guilty persons who are never guided by conscience, and who never feel either remorse or repentance. Such beings are even proud of their power of doing evil, and

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* Matt. vii. 18. † 1 Cor. ii. 14.

‡ Antilucrece, t. i. p. 164.

relate with pleasure the most remarkable stratagems and actions of their criminal lives. Hence, as it is certain that many criminals are not prevented from doing evil by conscience, and are rarely visited by repentance, it is necessary to establish some positive conscience, and to regulate actions by rewards and punishments.

My only intention is to prove that there is a fundamental power which seeks for justice, which is more or less active in different individuals, being so weak in some as to be by no means sufficient to restrain or to direct the inferior propensities. Weakness of the feeling of justice is a lamentable cause of disorder in the world, and is the true source of almost all moral and political vices. This deficiency makes men break engagements of all kinds; it makes it necessary to declare royalty inviolable, and to make the ministers of kings answerable; it is this deficiency also that renders positive laws indispensable to keep the individual propensities in order. The feeling of justice is the attribute of a noble mind, and is an essential condition of union and general happiness.

Dr. Guillié, of Paris, in his work on the instruction of the blind, maintains that these unfortunates are naturally deprived of sensibility, shame, and conscience. Mr. John Joach Roques has answered and refuted this extraordinary accusation in the fifth volume of the Revue Encyclopédique.* Conscience is certainly independent of sight. The blind, the deaf, and the dumb, follow their natural inclinations before they have received a moral education. The lower feelings are predominant in the greater number of them, as well as of other persons, and their actions, therefore, mostly resemble those of animals. Yet the want of sight or of hearing does not exclude either justice or benevolence. These faculties exist, and may act independently of each other. Convinced then that there is in mankind a sentiment which seeks for justice, and that its energy is

* Page 610.

very different in different individuals, and even in nations, I shall now consider its origin.

I have already explained and proved that the sentiment of benevolence is not the same as that of conscientiousness. Benevolence may even be contrary to justice. I may find it my interest to be very benevolent to certain persons. This behaviour, however, cannot easily be called just. Moreover the morality of our actions cannot be founded on religious faith and hope; such virtue would depend on selfishness, and would degrade those who practised it.

There are others still who derive conscientiousness from reason; but the desire to be just in one's actions is no science to be taught, and the sentiment of justice is by no means in proportion to the intellectual faculties. Criminals, too, have suffered the most severe punishments rather than betray their accomplices; yet who will conclude that such men acted from motives of justice?

It is said that Socrates invented morality at Athens; but Aristides was just before Socrates lived, and Leonidas had died for his country before Socrates taught that to love our native land was a duty. I therefore admit a fundamental sentiment of justice, which, in my opinion, also produces repentance, and constitutes the essential part of moral conscience. This feeling, however, does not determine what is just or unjust, right or wrong, true or false. These particular determinations depend on the other faculties with which the sentiment is combined; thus a person endowed with conscientiousness, and some of the lower propensities, will call that just which another who possesses conscientiousness combined with benevolence or veneration will call unjust*. A criminal in stealing from the rich and in giving to the poor may sometimes consider his actions as just. The combination of conscientiousness with other facul-

* "All the ways of a man are clean in his own eyes, but the Lord weigheth the spirits."—Prov. xvi. 2. "Every way of a man is right in his own eyes, but the Lord pondereth the hearts."—Prov. xxi. 2.

ties also explains why various legislators have taken such different moral principles as the basis of their regulations.

These latter considerations teach us that we cannot trust to the natural conscience of man to perform that which is right and advantageous for all; first, because few examine their actions according to justice; and, secondly, because those who do so are easily misled, and, influenced by their individual faculties, often arrive at erroneous conclusions; hence follows the necessity of establishing a determinate justice, or the law.

Now a question of much importance arises: Is the law or positive justice arbitrary? or is there a natural law which ought to be universally acknowledged and admitted as obligatory in all countries? Hitherto masters have commanded, and the law has made sin; but is there then no morality that is universal? Chemistry never varies, geometry and arithmetic ever remain the same; may it not be so with morality likewise? These considerations are philosophical and practical; they, therefore, belong to the philosophical part of Phrenology, where they are examined in detail. Here I confine my enquiries to the fundamental powers of the mind and their respective organs.

Let us now endeavour to find the situation of the organ of the sentiment in question. My observations induce me to admit it laterally on either side of that of firmness, occupying the space between this and the organ of circumspection. The cerebral part in this place is very little developed in all the criminals I have had an opportunity of examining. Those again who have the greatest confidence in the internal monitor, or conscience, and who examine all their actions in a moral point of view, have the brain in the situation indicated very large.

Dr. Gall and I differ widely in our opinions upon justice. According to him, there is no particular organ of conscientiousness or repentance; he formerly considered what is called conscience as resulting from the dominant character of an indivi-

dual being opposed to his particular actions. In this view there were consequently as many consciences as faculties; he even spoke of a good and of a bad conscience,—the first being the opposition of the good, and the second the opposition of the bad faculties to a particular action. Thus, if a good-natured man commit a fault or offend any one, he repents and his conscience torments him because he has acted in opposition to his dominant character. On the other hand, a usurer and a libertine are sorry for having neglected a good opportunity, the first of deceiving, the second of seducing some unsuspecting and innocent person. Dr. Gall calls this opposition of the dominant character to any line of conduct the natural conscience; but he says that we cannot trust to this, and that it is necessary to establish some positive conscience; that is, to determine what is to be done and what is to be let alone, without the individual desires of any one being considered. Therefore it is said: Thou shalt adore one God,—thou shalt not steal,—thou shalt not kill, &c.

It is certain that good-natured persons repent when they have committed a fault. A mother, for instance, who has been dishonoured and consigned to the most unfortunate of situations, may, in a moment of despair and confusion, deprive her new-born child of life; but the fatal concourse of circumstances being past, and the natural sentiments of benevolence and justice beginning again to act, she will feel the contradiction between her dominant character and her action. At Spandau, in Prussia, we saw a man who, although always looked upon as good-natured, had assassinated his wife in a paroxysm of rage. Existence ever afterwards hung upon him as a heavy burden. Yet it must be remarked that the opposition of the natural character alone to any action does not constitute conscience; a criminal will not feel repentance for having acted in a way which may be good in itself and not hurtful to him. A thief who voluntarily gives a part of his booty to the poor will not *repent* having done so, unless the act betrays him.

Dr. Gall, in saying that usurers repent having neglected a good opportunity of deceiving others, confounds repentance or remorse with the being sorry for, or being displeased. It seems to me that every organ not being satisfied, or being disagreeably affected, produces pain or sorrow; but I cannot conceive that every faculty produces repentance or remorse. This, as I have said before, is a peculiar affection of conscientiousness.

The preceding considerations further induce me to disapprove of Dr. Gall's division of the conscience into natural—good or bad—and artificial or positive. I divide it,—first, into *natural* or absolute, the effect of conscientiousness combined with all the other faculties proper to man, those which are common to man and animals being held in subordination; secondly, into *individual*, *particular*, or *rélative*, which results from the conscientiousness of every one combined with his other faculties; thirdly, into *positive*, which is fixed by legislation, whether divine or civil, as by the commands, Thou shalt not eat meat on Fridays or Saturdays; thou shalt go to church every Sunday, &c. Thus the sentiment of conscientiousness is the basis of morality; the entire moral character, however, depends on the addition of benevolence, veneration, and firmness, and is modified by the combinations of these with other fundamental faculties, whose functions ought to be in harmony with justice. Reason also must contribute to determine that which is just or unjust, right or wrong, true or false, and that which is duty. More details of this kind are given in the volume on the philosophical part of Phrenology.

Let us now examine the affective faculties, which besides veneration are essential to religion. They are such as principally constitute those feelings we designate by the names faith and hope.

XVII. *Organ of Hope.*

Dr. Gall considers hope as belonging to or as part of the function of every faculty; but I think that he confounds this peculiar feeling with desire or want. Every faculty being active desires; therefore even animals desire; but there is something more than this in man—a peculiar feeling, which is by no means proportionate to the activity of any other faculty. We may desire ardently, and yet be without hope.

The sentiment of hope is indeed necessary to the happiness of mankind in almost every situation. It often produces more satisfaction than even the success of our projects. Its activity, however, varies greatly in different individuals; whilst some easily despair, others are always elated; constant hope sustains them in the midst of difficulties; the first plan for accomplishing any object having failed only stimulates them to form new ones, which they confidently expect will succeed. Those who are everlastingly building castles in the air possess this faculty in a high degree. It seems to induce a belief in the possibility of whatever the other faculties desire, without producing conviction; for this results from reflection.

This sentiment is not confined to the business of this life; but, passing the limits of present existence, it inspires hopes of a future state, and belief in the immortality of the soul, which is promised by Christianity.

Hope, like any other faculty, may be too strong or too weak. In the former case it induces us to expect things which are unreasonable, not founded on probability, or altogether impossible. When its energy is too feeble, on the contrary, and circumspection predominates, this is apt to produce despair, melancholy, lowness of spirits, &c.

The organ of hope is situated laterally on each side of that of veneration.

XVIII. *Organ of Marvellousness.*

There is still a sentiment which exerts a very great influence over religious conceptions, and which, in my opinion, contributes more than veneration to religious faith. Some find all things natural and regulated by the laws of creation; many others are amused with fictions, tales of wonders, and miraculous occurrences. They find in every passing event extraordinary and wonderful circumstances, and are constantly searching after whatever can excite admiration and astonishment. This sentiment is to be observed among mankind at large, both among savages and civilized nations. In every age, and under every sky, man has been guided and led by his credulity and superstition. The founders of all nations have had a fabulous origin ascribed to them, and in all countries miraculous traditions and marvellous stories occur in ample abundance. There are many disposed to believe in dreams, sorcery, magic, astrology, in the mystic influence of spirits and angels, in the power of the devil, in second sight, and in miracles and incomprehensible representations of all sorts. Some also are disposed to have visions, and to see ghosts, demons, and phantoms. This sentiment gains credence to the true and also to the false prophet, aids superstition, but is also essential to faith and refined religion. It is more or less active, not only in different individuals, but also in whole nations; its functions are often disordered, constituting one species of insanity.

The legislators of antiquity, aware of the great influence of this faculty, made frequent use of it to enforce and to confirm their laws. They spoke in the name of God, of angels, or of supernatural powers. In our own days the religious sects of Swedenborgians, Methodists, Quakers, and many others, particularly demonstrate its influence and presence. In dramatic representations the introduction of ghosts, angels, transformations, and supernatural events, proclaims its activity both in the

author and in the public, by whom such exhibitions are relished and sought after.

The existence of this feeling is certain. Its organ is situated anterior to hope, and a great developement of the convolutions on which it depends enlarges and elevates the superior and lateral parts of the frontal bone. It is remarkably prominent in the head of Socrates, of Torquato Tasso, Dr. Price, Young, Stilling, Wesley, &c. My observations on it are extremely numerous, and I consider it as established.

The preceding facts determined me formerly to designate this feeling by the name of supernaturality; and it is certain that it is principally manifested by a belief in miraculous and supernatural circumstances, in the foundation of religion by supernatural means, and in its dogmatical points. As, however, the feeling may be applied both to natural and supernatural events, and in every case fills the mind with amazement and surprise, I do not hesitate to change the name of supernaturality into that of *marvellousness.* This name I prefer to that of *wonder,* adopted by Mr. Combe, because, according to Dr. Johnson's Dictionary, *wonder* is applicable only to surprise excited by natural objects, whilst *marvellousness* embraces both kinds of astonishment caused by natural and supernatural circumstances.

XIX. *Organ of Ideality.*

That a poet must be born has passed into a proverb, and education is generally acknowledged inadequate to produce poetic talents. Children sometimes exhibit such powers previous to all instruction, and there is the greatest difference among adults in the capacity. Pope says of himself, "I lisped in numbers, for the numbers came." Those who study the phenomena of insanity know that the talent of poetry is often excited and developed by this diseased condition. "Several facts," says Pinel, "seem so extraordinary, that they stand in need

of the most respectable testimonies in order to be admitted. I speak of the poetical enthusiasm which characterises certain fits of mania when verses are recited, which are by no means the result of reminiscence alone."* Pinel mentions several of his own observations, and quotes the case of a girl from Van Swieten, who, during her fits of mania, showed a rare facility in making verses, though previously to her illness she had been employed in manual labour, and had never had her understanding cultivated by education.

Before we left Vienna, Dr. Gall had looked for an organ of poetry, and even observed that the heads of great poets were enlarged above the temples in a direction backward and upward (*Pl.* IX. *fig.* 2, xix.); but he spoke guardedly on this point at that time. Since we commenced our journey, however, we have multiplied observations and accumulated facts to such an amount that Dr. Gall now admits an organ of poetry as quite certain.

It is true that all great poets, both of ancient and modern times, Homer, Pindar, Euripides, Sophocles, Terence, Ovid, Horace, Ariosto, Torquato Tasso, Shakspeare, Milton, Lord Byron, Schiller, Goëthe, Wieland, Racine, Corneille, Voltaire, &c. &c., have the cerebral part, indicated above, much developed. It seems to me, however, that there is no peculiar or single faculty of poetry in the widest acceptation of that term. We must therefore determine the essential of every kind of poetry, which I am inclined to attribute to this organ as its special faculty, whilst the species of poetry produced depends on the combination of this with the other faculties of the individual poet. It cannot be the faculty of versification; for some authors, J. J. Rousseau, Buffon, and many others, write in prose, and yet their expressions are highly poetical; while others make verses which contain no tinge of poetic feeling. Still less is it the faculty of rhyming, since among the ancients

* Second edition, p. 111.

rhyme was entirely unknown, and among the moderns poetry is not always in rhyme.

Now all great poets have this part of the brain much developed, but all who have it large are not necessarily great poets, though they be fond of poetical conceptions. Women illustrate this point; they often possess the organ much developed; are fond of poetry; but seldom excel in its composition.

I think that the poetic turn of mind results from a peculiar mode of feeling, a certain manner of viewing the world and events. A plain unadorned description of things as they are cannot be called poetry; exaltation, imagination, inspiration, rapture, and warmth in the expressions, are requisite to constitute compositions worthy of the name; all is represented in exaggerated terms, in a state of perfection, such as it ought to be. Poets picture forth a fictitious and imaginary world. Thus I admit a sentiment which vivifies the other faculties, and impresses a peculiar character called poetical or ideal. It may be combined with both the affective and intellectual faculties, and aspires to imaginary perfection or completion in every thing. It produces the sublime in the arts, makes enthusiasts of us in friendship, virtue, painting, music, or any other direction which our natural feelings or talents take.

The organ of this sentiment is placed by the side of marvellousness, and the two frequently act together, particularly in mythology. Poetry is often embellished by the addition of the mysterious and supernatural. I have collected many facts on this organ, and am quite certain that its function corresponds to the manner of feeling just now described. The degree of exaltation experienced by poets varies according to its greater or smaller developement.

Too great activity of the sentiment is a frequent cause of unhappiness, since it makes us look for a state of things which, as it does not exist, we cannot find. I call its organ that of ideality.

XX. *Organ of Mirthfulness or Gayness.*

There is something peculiar in the human mind, called *witz* by the Germans, and *wit* by the English, terms which have no exact equivalent among the French,—though the mental operation they express be very active in France. I explain this peculiarity by the combinations of the faculty, producing wit, with others, being different in Germany, England, and France. The French, eminently endowed with love of approbation, search constantly after distinction; they are consequently fond of merry sayings and showy expressions, delight in what are called *bon mots,* esteem the *esprit de saillie et de repartie,* and designate facility in these particulars by the name *bel esprit.* The Germans and English again frequently combine the faculty with that of reflection, and call it *witz* and *wit.*

Those who write like Voltaire, Rabelais, Piron, Sterne, Rabener, Wieland, and all who are fond of jest, raillery, ridicule, irony, and comical conceptions, have the upper and outer parts of the forehead, immediately before the organ of ideality, of considerable size.

It is difficult to define the primitive faculty whose exhibition accompanies this organization. Dr. Gall considers it as an intellectual power, and calls it in French, *esprit de saillie,* or *esprit caustique,* though he allows that this name does not indicate *witz* or *wit.* I repeat that, in my opinion, these words denote compound operations of the mind. Wit is commonly said to consist in facility of comparing objects, in order to discover their similarity or dissimilarity. But one may have the greatest talent for comparing ideas or objects, without possessing wit. The mode of comparing philosophically also differs very widely from that of comparing *wittily;* a comparison may be witty and philosophically erroneous at the same time.

I do not consider the faculty as intellectual, but as affective—as a sentiment which disposes men to view every thing in a gay and joyful manner. It may be applied to words, to things, to ideas, to arts, and to every mental manifestation. Hence the different names it receives from its modified functions, such as wit, good-humour, caricature, mockery, and irony. The poet, painter, sculptor, draughtsman, musician, orator, &c., often proclaim its activity in their productions. Combined with inferior feelings, and not restrained by benevolence, veneration, and justice, it is apt to offend by sarcasms, epigrams, and satires.

The faculty, it seems to me, was given to man to render him merry, to produce gaiety,—feelings not to be confounded with satisfaction or contentment; these are affections of every faculty, whilst gaiety and laughter belong to that which now occupies our attention. Its organ is situated, as I have said, in the upper and lateral part of the forehead, before the organ of ideality.—(*Pl.* IX. *fig.* 1. xx.)

Mr. William Scott, of Edinburgh, as Mr. G. Combe mentions in his *Elements of Phrenology*, p. 122, has taken a particular view of this faculty. He believes that its primitive function is to distinguish differences. According to him, the faculty of comparison perceives resemblance, the one we speak of, in particular differences, and causality (situated between the two) necessary connexion: the three combined, therefore, form the truly philosophic understanding.

Mr. G. Combe thinks well of this view (*Elements*, p. 218), and, therefore, preserves the number and name of this organ as they stand in the two first editions of my Physiognomical System. In my French publication I change these, as I consider the name wit insufficient, and the faculty, so styled, a feeling. I do the like here, being more and more convinced that the alteration is proper. As to the view taken by Mr. William Scott, I reply that, in my opinion, the same power which perceives resemblances perceives differences also. I

see no reason for adopting two faculties for the act of discrimination. But, even granting Mr. William Scott's supposition of one power for perceiving resemblances, and another for perceiving differences, I still think it necessary to admit a special feeling of ludicrousness or mirth. We may excite laughter, it is true, by making comparisons of things which differ, but we may do so also by comparing things which resemble each other. If amidst incongruity and difference we seek for analogies, the faculty of comparison is active, and combined with ludicrousness, it will undoubtedly make us laugh. But we may laugh heartily at a single object, without allusion to any difference. Those who are the most disposed to laugh and to be merry are not always the most intelligent and the most skilful in distinguishing either analogies or differences. The feeling of mirthfulness, therefore, seems to be special. It may be excited by pointing out differences or resemblances, by the agency of various feelings, by playing tricks, or by inspiring fear. The fundamental power then cannot be wit. This is only one of its applications, and results from its combination with intellect. I propose the name mirthfulness, or gayness, to indicate the peculiar feeling.

XXI. *Organ of Imitation.*

Dr. Gall would not probably have thought of searching for the organ of a faculty for imitating, had not one of his acquaintances, Mr. Hannibal, at Vienna, who possessed this power in great perfection, and was an excellent actor, desired him to examine a transverse furrow in the middle of his head. The hollow Dr. Gall found, but he was more struck with a considerable elevation of a semi-globular form before it. Shortly after this, in the Institute for Deaf and Dumb, he perceived a configuration of the upper and fore part of the head, exactly resembling that of his friend's, in an individual who, having for the first time put on a mask at the carnival, imitated perfectly

all those who frequented the institution. These two cases furnished a basis for further observation; and after much research both in Vienna and during our travels, and finding a regular coincidence between the developement of the cerebral part in the situation described, and the faculty of imitation, we admit its function as demonstrated. Those who have it highly developed are fond of acting, and of dramatic representation; they also often imitate the gestures, voice, manners, and in general all the manifestations of man and animals. (*Pl.* IX. *fig.* 2, xxi.)

The existence of the faculty of imitation is proved in the same way as every other primitive power. It is in general more active in children than in adults; and it is known that children learn a great deal by imitation: they do what they see done by others; they repeat what they hear told. It differs much in adults, and is not at all proportionate to the other faculties. Those who have it large speak not with words only, they accompany all they say with appropriate and descriptive gestures, and imitate the voice, air, and behaviour of those who form the subjects of their conversation. Sometimes idiots from birth imitate much of what they see and hear. Cabanis* mentions the case of one whose desire to imitate the attitudes and movements of others was irresistible. Pinel relates† the case of an idiot female who imitated all that was done in her presence, repeated automatically what she heard told, and imitated with great correctness the gestures and gait of the insane in the hospital. Finally, the correspondence between this natural capacity and the state of a certain organic apparatus, proves beyond doubt the existence of such a power.

Its sphere of activity is very great, especially during infancy. Some, throughout life, manifest it in an eminent degree, and feel a peculiar pleasure in theatrical performances. Though

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* Du Rapport entre le Physique et le Moral de l'Homme, t. 1.

† Second Edition, De l'alienation Mentale, p. 99.

indispensable to actors, it, however, of itself neither constitutes the comedian nor the tragedian. Its combinations with other mental faculties show how far individual actors are fitted to play particular characters. Alone the faculty does nothing but imitate, and any actor may copy the manner of playing of others without being capable of conceiving the expressions or natural language of a given character. To do this, the individual faculties which constitute that character must be combined with imitation. This view explains why an actor may be perfect in one line, and scarcely middling in another. The possession of the faculty of imitation is essential to success in the arts of drawing, sculpture, and painting; it gives what is called expression and life. Without it the productions of artists are stiff and inanimate. It aids orators essentially by regulating their declamation and gesticulation.

It is difficult to say to what extent animals possess this faculty. Monkeys do various things like man; but is this in consequence of mere imitation, or of their having certain powers in common with man? The latter part of the question would seem to be well answered, in many cases, in the affirmative. On the same principle, the imitation of singing-birds may be explained rather by the faculty of tune than by imitation alone. The power of melody perceives, recollects, and repeats the song of other birds or of man. Yet I admit that the primitive power of imitation exists among many tribes of the animal kingdom. Parrots not only repeat harmonious tones, but all sorts even of harsh and discordant noises.

Dr. Gall attributes to imitation the pleasure which some persons feel in being masked. For my part, I think that the love of imitating costumes, actions, and gestures, and the desire of concealing the face with a mask or domino for the sake of intrigue, cannot be confounded together. Whenever concealment interferes, the organ of secretiveness is active, and plays a principal part.

The three faculties last discussed are essential to theatrical

performances. They most generally act in combination with the intellectual faculties, but their nature seems nevertheless to be rather affective than intellectual.

General Reflections on the Affective Faculties.

Reasoning will never refute the idea of peculiar organs being necessary for the affective manifestations of the mind. The mind in itself may be simple, but observation shows that each sort of affective operation is attached to a particular part of the brain. Another essential point is that the affective faculties depend on internal sources, that they are often active spontaneously, and not from the excitation of external causes; moreover their functions are always involuntary; and, finally, they exist independently of understanding, for they are blind impulses, and are only enlightened by the addition of reason. They are almost the sole causes of the variety of action that degrades or exalts the human character. It is a just idea to represent ignorance as an evil spirit. Love, too, is well figured with bandaged eyes. Emblematic portraitures of all feelings might be similarly circumstanced; for the very highest sentiments of human nature, without the guidance of intelligence, err incessantly. How necessary then to cultivate the powers which point out the sources of our errors, and how blasphemous and irreverent towards the great Creator every attempt to repress the exercise of intelligence! The friends of humanity cannot stigmatize sufficiently, nor expose in too strong a light to the execration of mankind, that abomination religious despotism, which interdicts reason, and requires of those who would obtain eternal happiness blind faith and unenlightened obedience. Such a tyranny can be exerted only to continue errors of every description, and with these to inflict every kind of evil upon the world; it even renders the possibility of avoiding or correcting falsehood unattainable.

SECTION IX.

Of Understanding, or the Intellectual Faculties.

I call *intellectual* every faculty which procures to man or animals any kind of knowledge, cognition of any impression, be it of hunger or thirst, of the sensation of fatigue, of pain, of the affective functions, of the existence of external objects, their qualities or relations. Knowledge, then, is the essential object of the intellectual faculties. I divide the order of intellectual faculties into three genera, which I shall investigate separately in as many chapters. In the first I shall speak of the external senses; in the second of the faculties which know external objects, their physical qualities and relations; and in the third of those which reason or reflect on the operations of all the other mental powers.

CHAPTER I.

External Senses.

The external senses permit man and animals to communicate with the beings around them: it is by their medium that determinate consciousness of the external world is acquired; without them man and animals would only have an *internal* existence, but not, as Richerand says, a mere *vegetative* existence. What then can be more interesting to man than his senses, to which he owes so many sensations, so many enjoyments? Hence the assiduous study of their functions and structure by philosophers, physiologists, and anatomists, who nevertheless made little progress, and left many essential points in darkness. On the other hand, various extravagant and contradictory opinions have been the fruit of their labours. Of a few of these I shall take brief notice.

I do not remember that the affective powers have ever been derived from the external senses. This, however, is not the case in respect to the *intellectual* faculties. According to many ancient philosophers all ideas are innate, and are only excited by the external senses. Since the time of Bacon and Locke the greater number of philosophical systems rest upon the axiom of Aristotle, that all ideas enter the mind by means of the external senses. According to this principle the perfection of the intellectual faculties must depend on that of the external senses. Now if the ideas and sensations of man and animals are either produced or excited solely or specially by one or other of the five senses, they ought to manifest capacities only according to external circumstances and accidental impressions; their faculties ought to bear relation to the state of the five senses and to the education these have received; and individuals ought to be susceptible of change and modification at pleasure. Daily experience, however, contradicts this hypothesis, with all its conclusions.

Another class of philosophers maintain that the mind acts independently of all organization, and that the senses are rather an impediment to, than instruments in, its action. They complain much of the illusions of sense, and despise all testimony and every conclusion grounded upon sensation. According to them, that only is truth which may be conceived by the understanding alone. If the influence of external objects, of social institutions, of education in general, be denied, it would be to contradict the history of all times and of every individual. If truth resulted from reflection alone it would be easy to establish general laws, and it would be unnecessary painfully to collect a great number of facts, and to perform a great number of experiments in order to deduce general principles. But history proves the insufficiency of reflection alone, that is, of reflection unguided by experiment.

Finally, another sect of philosophers admits two sources of intellectual manifestations, an external and an internal, on one or other of which all are dependent.

I shall first consider some generalities of the external senses; afterwards show that many faculties attributed to them cannot result as effects of their activity, and, in fine, examine the special functions of each external sense.

GENERAL TIES AS TO THE FIVE EXTERNAL SENSES.

I. *Doubleness of the Organs.*

The organs of every external sense, as of the functions of animal life in general, are double: there are two eyes, two ears, two nerves of smell, of taste, and of touch. Some authors have denied the doubleness of the cerebral organs; but the denial was founded on their mistaking doubleness for symmetry. It is true that both sides of the brain are seldom symmetrical; but is not this the case with the eyes, ears, and other double parts? Thus the want of symmetry does not prove that they are not double. Indeed the nerves generally are larger on the right side of the body, which is also larger and stronger than the left. It is commonly maintained that the right hand and foot are larger in the generality of cases, because they are more used and exercised than the left. But this may be answered by the fact of the plurality of infants being right-handed. Of ten children born there are perhaps seven who from birth employ the right hand without any teaching; and though the remaining three be taught to use it they nevertheless feel greater strength in the left. But the superior power of the right hand is not the result of exercise, for, as I have said, all parts of the right side are stronger than of the left, even to the hemisphere of the brain.

Disease, too, most frequently attacks the left side.

The organs of animal life, then, are double, while those of vegetative life are mostly single.

II. *The Consciousness of every Sense is Single.*

Another generality of the five senses is that while each has two sentient apparatuses, and accordingly receives double impressions, consciousness is still only single. Various theories have been offered of this phenomenon, and sight has generally been examined in its discussion. The explanation has been given by—

1. *Touch.*

Many suppose single consciousness to be a consequence of the information communicated by the sense of touch. At first, say they, objects are seen double, but touch rectifies the error. This was Buffon's opinion. He supported it by the following experiment: If we look with both eyes towards two objects in the same direction, and fix our eyes upon the nearer, we see it single, but at the same time the farther double; if, on the contrary, we fix upon the farther object, we see it single, and the nearer double. This experiment, according to Buffon, proves evidently that objects are seen double, but judged single by the rectification of the touch. As the same object, however, appears at one time double and at another single, how is it possible to infer that touch has corrected sight? Why is the correction only relative, referring now to the nearer, then to the farther object? It seems to me that a very different conclusion may be drawn from the experiment, viz. that touch has nothing to do with sight. Sight, and all its modifications and allusions, depend on the organization and position of the eyes and on the laws of the refraction of light.

Moreover, no one recollects ever having seen objects double during his infancy. None of those born blind, who have re-

covered their sight by a surgical operation, ever saw objects double. Neither have we observed nor heard that animals take single objects for double ones. The butterfly does not confound a flower, nor the lamb its mother, with their shadows. Even animals which live during so short a time that they can never rectify their vision by touch are not deceived by the multiplicity of objects. Sometimes, moreover, in morbid affections of the eyes, and from squinting, man sees double, notwithstanding all his preceding experience. It is consequently evident that the cause of single vision is not to be found in the sense of the touch.

2. *Corresponding Points.*

Others explain single vision by saying that, if the image of any object fall upon corresponding points of the retina, that is, upon points which are commonly affected simultaneously, the object appears single; but if the image fall upon different parts of the retina, which, in general, are not affected at the same time, the object appears double. This explanation is very commonly received. Cuvier and Richerand admit it. It is rare, however, that corresponding parts of the retina are affected at the same time.

3. *Inequality of the Eyes.*

Several again maintain that inequality of the eyes causes the single consciousness of sight. According to them the impression on the stronger is alone perceived. It is indeed true that very few have both eyes equally strong, consequently the impression upon each eye is of unequal force. But, if only a single impression were perceived, why should we see better with both eyes, and hear better with both ears, than with one?

4. *Decussation of the Optic Nerves.*

Ackermann finds an explanation of single vision in the decussation of the optic nerves. Such an arrangement, however, does not exist in the auditory nerves. And the single consciousness of sight, hearing, smell, and taste, must all necessarily be explained in the same manner.

5. *Active State.*

Dr. Gall ventured to give another and a different explanation. He distinguishes two states of activity in organs of the senses, calling one active, the other passive. The functions are passive if performed independently of the will; the eye, for instance, necessarily perceives the light which falls upon it, and the ear the vibrations propagated to it. Now we perceive *passively* with both organs, says he; we see with both eyes, hear with both ears, but the active state is confined to one organ, and commonly to the strongest. We see with both eyes at the same time, but we look with one only; we hear with both ears, we listen only with one; we feel with both hands, we touch with but one, &c.

There is no doubt that we look with one eye only. In placing a pencil or any other thin body between us and a light, keeping both eyes open and throwing the axis of vision, the stick, and the light into a right line, did we look with both eyes, the pencil should occupy the diagonal and its shadow fall on the nose. But this always falls on one eye, on that which the person, who makes the experiment, ordinarily uses in looking with attention. If the pencil be kept in the same position, and the eye not employed in looking be shut, the relative direction of the objects will seem to remain the same; but, if he shut the eye with which he looked, it will be altered, and the pencil will appear removed far from its former place. Again, let any one look at a point but little way distant,

both eyes will seem directed towards it; let him then shut his eyes alternately. If he close the one with which he did not look, the other remains motionless; but, if he shut that with which he looked, the other turns immediately a little inwards in order to fix the point. Moreover, the eyes of many animals are placed laterally, and cannot both be directed at once to the same object. Finally, the gestures of man and animals prove that they look with one eye, and listen with one ear; for they direct one eye or one ear towards the object to be seen or heard.

To this Walther and Ackermann have opposed an erroneous conclusion from a certain experiment. Knowing green to be a compound of yellow and blue, they inferred that this colour would be produced by looking through spectacles of which one glass was blue and the other yellow. Dr. Gall and I often tried this experiment, but never with any such result. Both glasses of the spectacles being equally thick, we found objects tinted with the colour of that before the eye habitually used. When they were of different thicknesses, the colour of the thinner was perceived.

It may be asked, which eye is most ordinarily employed in looking? Le Cat thought it was changed every day. Borelli believed the left eye to be strongest; but Le Cat asserted that sometimes the right, sometimes the left, had greatest power. We have observed that, as in general the whole right side of the body is stronger than the left, so the greater number of persons look with the right eye. All do not, however, look with their strongest eye.

Notwithstanding what has been said, Dr. Gall's explanation seems to me little satisfactory. Indeed it is very remarkable that passively we perceive at the same time the impressions of both organs of any sense, not only if one but also if different objects impress the two. Even different impressions of different objects may be perceived by both organs of two senses at once. We may, for instance, with both eyes see

different objects at the same moment that with both ears we hear different sounds. As soon as we are attentive, however, as soon as we look or listen, we perceive but one impression. It is impossible, therefore, to attend to two different discourses at once. The leader of an orchestra hears passively all the instruments, but he cannot be attentive except to one. The rapidity of mental action deceives several, and makes them think it possible to attend to different objects at the same moment. It follows that there is a difference between the active and passive state of the senses; but whether this difference suffices to explain the single consciousness of every sense is another question; I think it does not.

First, this explanation would only apply to functions in their active, not at all in their passive state; and the cause of single consciousness must be the same in both. Further, the active state is not produced by the external senses themselves, any more than voluntary motion by the mere muscles. Some internal power renders the senses active; they themselves are always passive, and merely propagate external impressions; they appear active only when something internal employs them to receive and to transmit impressions to the brain. It is therefore probable that the internal cause which excites only a single organ of the external senses to activity is also the cause of the single consciousness of different impressions. Dr. Gall's explanation of single consciousness is consequently not only grounded upon an inaccurate notion, but would be far from satisfactory were the supposition even true.

6. *Commissures.*

Another explanation of single consciousness may be found in the commissures or uniting fibres of both organs. For, though every organ of sense be double, similar parts on each side are united by a peculiar apparatus. The impressions of both organs may possibly be combined by this arrangement. In admitting

that this would explain single consciousness in the case of any given sense, it would not, however, explain single consciousness of impressions received by different senses.

7. *Central Point.*

The explanation having the old idea of a central point for its basis will no longer be listened to, as anatomy proves that no such point exists in the brain. From all that has been said, it is evident that we are not acquainted with the true cause of single consciousness. No fact either in anatomy or physiology explains the phenomenon.

III. *Every Sense has its own peculiar Nature.*

A third generality of the five senses is that its own power suffices to each to perform its function. Although much has been said of the mutual rectification of the senses, and of their habits, it is a general principle that the power or capacity of every sense is inherent in the sense itself. The relation of the senses to external impressions is determinate and subject to positive laws. As soon as odoriferous particles impress the olfactory nerve, the impression is at once either found to be agreeable or otherwise, and, according to this relation between external impressions and external senses, the manner of acting of man and animals varies. No preceding exercise or habit furnishes each sense with its special power; this depends on its peculiar organization alone. If the organization be perfect, the functions are in like manner; and, if it be imperfect or diseased, these are defective or deranged notwithstanding all preceding exercise. If the optic apparatus be perfect in birds, when they break the shell, their sight is perfect; on the contrary, if the organization of the eye and ear in new-born animals be imperfect, seeing and hearing are the same; and, if the eyes of adults be diseased, vision is deranged. In

the aged the functions of the senses lose their energy, because the vital power of the organs decreases.

It is indeed absurd to suppose that nature should have produced any sense incapable of performing its functions without support from another and a different one; for example, that the eye should not see without the aid of touch, or the ear not hear without assistance from sight. We must, therefore, enter into the following positions: none of the senses acquires its faculty from any of the others; every sense cannot produce like sensations; different senses may distinguish existing objects; and one sense is fitter than another to acquaint us with particular bodies and their qualities. The laws of sight are determinate; and a straight rod half plunged into water appears crooked, because it is seen according to the laws of the refraction of light. Touch, however, proves that the rod is straight. This is a kind of rectification; but this must not be confounded with the idea according to which one sense acquires its faculty by the rectification of another. Touch may show that a rod plunged in water, which looks crooked, is straight; but the eyes will always see it crooked. Such rectification of the senses is mutual and general, not the prerogative of any one in particular. The eyes may rectify the sense of touch: if, without our knowledge, a piece of thin paper be placed between our thumb and fore-finger, we may not feel, but we may see it. Even smell and taste may rectify the senses of sight and touch. Many fluids look like water, feel like water: but smell and taste proclaim them different. Thus every sense has its peculiar and independent faculty, is subject to constant laws, and depends on the state of its appropriate organ for its capacity to perform its office; but every sense also recognises impressions imperceptible to another, and in this way are the senses mutually aidant in coming to exact notions.

IV. *Every sense may be exercised.*

Another observation generally applicable is that, though no sense acquires its faculty by exercise, yet the function of every one is strengthened by it. The sense of feeling, long and carefully exercised, acquires a very high degree of perfection. Thus the blind know the proximity of external objects by the impression of the air upon their faces. Le Cat speaks of one born blind at Poiscaux, who distinguished the distance of the fire by the degree of its heat. Saunderson, though blind, in handling a series of medals, discerned the false from the true more exactly than many connoisseurs. Le Cat mentions a blind sculptor, Ganibasius of Volterra, who traced the living face with his fingers, and modelled it in potter's clay. The deaf and dumb, in the institution of Mr. Eschke, at Berlin, knew perfectly what was written on their back, though covered with clothes. Boyle and others relate histories of the blind, whose touch was so acute as even to enable them to distinguish colours and their shades. The same thing is stated of the blind Weissenbourg, of 'Manheim. This man had about thirty pieces of different-coloured cloths, and could indicate with precision the hue of each; but he often made mistakes in the colour of strangers' clothes. The cards with which he played were marked; he did not distinguish them by their colours, as those who were not acquainted with this imagined. Many blind persons have assured me of their incapacity to distinguish colours. A few, however, discern white from black, because white surfaces are in general smoother than black. When the blind pretend to distinguish colours, they do no more than determine surfaces of greater or less degrees of smoothness, without acquiring any idea of colour in itself.

The sense of taste as well as every other is strengthened by exercise. Certain articles are tasteless and unpleasant at first, for instance oysters and truffles; but having been eaten several times, their particular savour is distinguished. A

common opinion is that the sense of taste is blunted by spiced dishes and refined cookery. But who will maintain that our cooks and dainty-mouthed gourmands have a more obtuse taste than savages, who distinguish the flavour of some roots insipid to a civilized palate? Do not the frequent accidents from poisonous vegetables, hemlock, belladonna, and improper mushrooms, prove that the taste of the sober countryman is no surer guide than that of the voluptuous citizen? We must, however, admit in regard to taste what happens universally; too strong impressions blunt its sensibility; the functions grow more energetic only by a due quantity of exercise.

The sense of smell may also be exercised. Many physicians, on entering a sick room, distinguish the kind and state of certain diseases. It is related that some negro tribes follow others by the scent, as dogs do, and even distinguish between a negro and a European. Smell is blunted by the application of very strong and penetrating odours; conformable exercise alone strengthens its functions.

The sense of hearing, like the senses already spoken of, is cultivated by exercise. The blind Weissenbourg, of Manheim, judged exactly of the distance and stature of persons who spoke to him standing. The blind Schoenberger, of Weide, in the Upper Palatinate, had the sense of hearing so acute that it was sufficient by tapping to indicate the place where the nine pins were set up, or the situation of the target to be shot at, to enable him often to throw or shoot successfully. Blind persons indeed often find a pin or piece of money which makes a noise in falling.

Finally, the eyes acquire a very high degree of acuteness by exercise. Le Cat mentions a deaf woman of Amiens, who distinguished what other persons said from the mere motion of their lips. When a foreign language was spoken, she discovered it immediately. Dr. Gall and I observed similar cases at Berlin and elsewhere; nay, we conversed with several who understood us, even when we concealed the mouth; the motions of the face

were sufficient. It follows, then, that though exercise produce not the faculties of the external senses, the functions of each may still be rendered more energetic by exercise.

V. *The function of every sense is modified.*

A fifth general consideration of the external senses is that their functions are modified not only in different kinds of animals but even in different individuals of the same kind. The taste and smell of carnivorous and herbivorous animals undoubtedly differ. The ox and horse find hay to be savoury, while the dog and wolf find flesh to be well-tasted. The senses are also modified by different ages, according to peculiar habits or circumstances, and even participate in thé various states of health. This fact explains the longings felt during pregnancy, or experienced by hypochondriacal and hysterical people, and also why we are sometimes disgusted with what we formerly liked. Moreover, several substances inodorous to man make a strong impression on the olfactory nerves of certain animals. Some animals, too, are much excited by odours to which others are indifferent. One odour is agreeable to one individual, and disagreeable to another. In the same way, the eye and ear must differ in animals living under water, from those of creatures which inhabit the air; the eyes even differ in those animals which see in the night from those which see during the day. One individual likes a colour or a sound displeasing to another. Thus the functions of the external senses are universally modified.

Functions to be denied to the five senses.

To specify the functions of the external and internal senses is an essential point in Phrenology, however difficult the task may be. Physiology in this department is but little advanced, and whether the external senses have consciousness or not is still a matter of dispute. The considerations on sen-

sibility in the first section of this work, and those contained in this chapter, leave the point still undecided. I shall, therefore, confine myself here to such points as may be proved by experience.

The axiom of Aristotle, that all activity of the mind depends on the external senses, is not less erroneous than is the assertion that the sense of touch is the cause of the instinctive labours of animals, and of the mechanical arts of man. It is easy to show, in a general way, that the notions of external objects acquired by man and animals are not merely dependent on the external senses, and in particular cases that such and such a talent is not the effect of this or that individual sense. Let us begin with the general refutation.

That the cognition acquired by animals and men of the external world, and the superiority of the human understanding, cannot be attributed to the external senses, appears to me in this, that there is no proportion between intellectual operations and the senses, either in different species of animals, or in different individuals of the same species. Many animals surpass man in acuteness and strength of external sense, yet none approaches man in understanding. Moreover, idiots frequently possess very perfect senses, while the most intelligent have them occasionally very weak. A fact mentioned by Darwin* also proves that the five senses are mere intermedia, and that the import of their impressions must be judged of by something internal. An old man, who had had a paralytic stroke, preserved the senses of hearing and of vision untouched; he, however, could only receive ideas by means of the latter; when he was told that it was nine o'clock and breakfast-time, he repeated the words distinctly, yet without gaining any information from them; but if his servant put a watch into his hand, and showed him the hour gone by, he said, "Why, William, have I not my breakfast?" On almost every occa-

* Zoonomia, third edition, vol. iv. p. 295.

sion, his servants could only converse with him by means of visible objects, although his hearing was perfect.

The case of James Mitchel, in Scotland, furnishes evident proof of the external senses not producing the affective and intellectual faculties, but of their being mere intermedia between the external world and the internal mental powers. As this case is of the utmost importance, I shall state it with some details, drawing upon the accounts published by Dr. Gordon, Dugald Stewart, and James Wardrop, as well as all I learnt from his sister on a visit I paid to Nairn.

He was born on the 11th of November, 1795, deaf and blind, of intelligent parents. It may be supposed that he is not without some internal sense of hearing, since he takes great pleasure in striking hard bodies upon his fore teeth, which he sometimes continues to do for hours together. "When a bunch of keys," says Dr. Gordon, "was given to him, he seized them with great avidity, and tried each separately by suspending it loosely between two of his fingers, so as to allow it to vibrate freely, and, after tingling all of them amongst his teeth in this manner, he generally selected one from the others the sound of which seemed to please him most. This was one of his most favourite amusements, and it was surprising how long it would arrest his attention, and with what eagerness he would on all occasions renew it. Mr. Brougham, having observed this circumstance, brought to him a musical snuff-box, and placed it between his teeth. This seemed not only to excite his wonder, but to afford him exquisite delight; and his father and his sister, who were present, remarked that they had never seen him so much interested on any former occasion. While the instrument continued to play he kept it closely between his teeth, and when the airs were ended he continued to hold the box to his mouth, and to examine it minutely with his fingers, expressing by his gestures and by his countenance great curiosity."

He was always possessed of so much of the sense of sight as to be able to distinguish day from night, and to perceive bright

colours, particularly white and red. He was fond of shutting the house-door or window-shutters, and remaining for a considerable time with his eyes fixed on some small hole or chink through which the sun's rays penetrate. He, however, seemed to derive no information from sight, as he always turned away his head while examining the bodies presented to him.

His senses of touch and smell were very acute, and by their assistance he was soon able to distinguish things and persons, strangers and those of his family. "When a stranger approached him," says Mr. Wardrop, "he eagerly began to touch some part of his body, commonly taking hold of his arm, which he held near his nose, and, after two or three strong inspirations through his nostrils, appeared decided in his opinion. If it happened to be unfavourable, he suddenly went to a distance with the appearance of disgust; if favourable, he showed a disposition to become more intimate, and expressed by his countenance more or less satisfaction." When I visited him, in 1816, his sister told me that of late years he had made less use of his smell than formerly, in making himself acquainted with external objects, and no fact has shown that he ever distinguished the presence of any one by the smell alone. In the year 1808, the drums of both ears were pierced, the one by Sir Astley Cooper, the other by the late Mr. Saunders. In 1810, when fourteen years of age, Mr. Wardrop performed an operation on his right eye, which enabled him to see surrounding objects, if not very minute. He nevertheless continued to examine every thing with his other senses, as if he had been totally blind and deaf. He is most attracted by red, and looks longer at it than at any other colour; then comes white, and after that yellow. He gathers together in the fields flowers of the same kind. He cannot measure exactly the distance of the objects from him, but he puts out his hand in their direction, and examines them in the mode already stated. This young man, though deprived of the two principal senses of relation, was from infancy anxious to acquire knowledge of external ob-

jects. He also manifested the different feelings without having been able to observe them in other persons.

He was always fond of young children; he took them affectionately in his arms but never associated with, nor joined in the amusements of boys of his own age. He, however, liked the company of the boy who attended him in his excursions, in order to keep him from dangerous situations. Early in life he was uneasy when his attendants were changed; later he was less sensible to it. He was very much attached to his relations. Dr. Gordon had mentioned that Mitchel was not sorrowful at his father's funeral—that he moved rapidly among the crowd, touching almost every body, and examining some very minutely. The Rev. Thomas Macfarlane, on the contrary, in a letter to Mr. Glennie of Aberdeen, dated the 7th of May, 1812, positively says, "When the coffin which enclosed his father's corpse was brought from the house, and placed upon chairs in the court before the manse, previous to the interment, I approached to the coffin, and soon after saw James Mitchel come from the house in considerable agitation. He turned about rapidly, and snuffed very much, evidently guiding himself by the smell. He directly approached the coffin, smelled it most eagerly for several seconds, then laid himself down upon the lid on his face, and embraced the coffin, while his countenance discovered marks of the most lively sorrow. I stood close by him; and after a short time patted his head once or twice, upon which he rose, and returned into the house. This occurred immediately upon the coffin being brought out, and about twenty minutes before it was lifted in order to be carried to the churchyard. As the accuracy on this subject has been doubted, I purposely delayed writing to you, till I should have an opportunity of conversing with the Rev. Pryce Campbell, minister of Ardensien, brother-in-law to Mrs. Mitchel, who was present at the funeral, and by whose direction every thing was conducted. I fell in with this gentleman. I took an oppor-

tunity of asking him if he observed any marks of sorrow about James Mitchel on the day of his father's funeral. He replied that he observed the most unequivocal marks of grief in his countenance, and added a circumstance which escaped my notice, that when the coffin was about to be lifted, in order to be carried to the churchyard, James Mitchel clung to it, endeavouring to prevent it being carried away, and he (Mr. Campbell) was obliged to remove him from it by force." Both these gentlemen remark that the circumstances mentioned by Dr. Gordon of Mitchel's running through the crowd, and touching every person, do not amount to a proof that he was insensible to the loss he had sustained. In acting thus, Mitchel was merely examining the assemblage of people around him, and in this instance his curiosity overcame his grief. He went several mornings to visit the grave, patted gently the turf which had been laid over it, and at last, as if hopeless of his father's return, became sorrowful even to tears. Shortly after his father's death, his mother being unwell and confined to bed, he was observed to weep. Afterwards the mother left Ardelach and went to Nairn. James Mitchel returned three times to visit his former habitation. On his first visit he went through the different apartments of the manse, examined the furniture, and, having done so, betrayed an anxiety to be gone, and returned directly to Nairn. On the other visit, several workmen were employed taking down the kitchen. He stood some time, evidently very much displeased at what was going forward, and then went away without having been prevailed on to enter the house. On his third visit the manse was repaired, and he came home in good humour; and, to communicate what he had observed to his sister, he lifted his hands, one after the other, in succession, from the floor towards the ceiling of the room. In the year 1814 he had a severe illness, during the course of which he took a particular fancy to his aunt, his father's sister, who was at that time living with his mother, and insisted on her constantly sitting by him. It

happened that his sister was taken unwell before his own perfect recovery; and he would not now allow this aunt to sit down near him, but always made signs that she should go up stairs, where his sister was, nor did he rest till he had made good his point. He showed a wish to get up stairs himself, and upon being brought up seemed quite satisfied when his sister patted him, and shook hands with him. Thus there can be no doubt of his affection and consideration for others.

He is generally placid, and of a mild temper; but if too much teazed, or if interrupted in his amusements, he is irritated, and sometimes gets into paroxysms of violent rage, when he tears his clothes. He is now grown up, and no longer under the control of his mother and sister. He is cautious, but not timid. He would formerly take food from no one but his parents and sister. From infancy he has been fond of retiring to a dark corner, and kindling a light. He continues to dislike darkness; after night-fall he seems happy in reaching a room where there is a candle or a fire. Means have been used to teach him to make baskets; but he wants application to finish any thing, and throws the materials into the fire; yet he knows from experience the danger of fire, water, and sharp instruments. He has frequently amused himself with a dead fowl in the kitchen, placing it repeatedly on its legs, and laughing when it fell. He was allowed to touch his father's corpse; as soon as he felt it he shrunk away. This was the first time he had ever touched a dead body. Several years later a neighbour, who had frequently indulged him with a pipe and tobacco, died. His sister brought him to the room where the body lay, and allowed him to feel it. This he did very readily, not shrinking away as formerly when he touched his father. He even seemed rather anxious to examine it; when he had so done, he stood for a few seconds rather thoughtfully, and then smiled. He now retired willingly; but not before he showed that he recognised the person, and was sensible of what had happened. This he did by making his

usual sign for smoking, and by putting his hand to the ground, his sign for interment.

He seems now apprehensive of dying. When, in 1814, he was so much reduced as to be incapable of walking without support, he could not be prevailed on to lie a single day in bed. He watched the first appearance of dawn, and insisted on being dressed immediately; thinking probably that he would not die out of bed. He could bear to see nothing white near his bed, or even in the room with him, when unwell. Several times, something white being by accident thrown across the foot of his bed, he appeared most unhappy till it was removed; and even when linen was put to the fire, to air, he was in the greatest possible distress. This dislike was explained from his having always seen dead bodies laid out in white.

He always took pleasure in making prisoners of other persons by locking them in the stable, or in a room, laughing and jumping about all the while. His sister sent him one day with a halfpenny to buy two pipes. He understood the signs, went out to a shoemaker's house, where they were to be had, and returned with one in his hand. They suspected that he had another about him, and, giving him to understand that he ought to have brought two, his sister insisted on his going to fetch the second. He then unbuttoned his coat, and laughing heartily produced the second pipe. The Sunday after this, when his sister gave him a halfpenny, as usual, in church, to put into the poor's box, he placed it between his teeth like a pipe and laughed, but, she having given him a shake, he dropped it into the box. When I saw him, he was allowed four pipes of tobacco a-day. His love of smoking being well known, several persons in Nairn gave him tobacco, when they met him in the street, but this he never produced until he had had his daily allowance at home. He used formerly to break his pipe as soon as it was smoked out; he now makes each serve twice before he breaks it. When he has received tobacco from strangers, however, it serves much oftener, as he

is aware that two a day are his allowance. They once gave him a more durable pipe, but he threw it away. He did the same with old shoes, in order not to be forced by his parents to put them on any more. It is quite certain that he has ideas of property. He once, at no great distance from the manse, met a person riding a horse which had been purchased a few weeks before from his mother. On feeling the animal, he seemed instantly to recognise it. The rider dismounted, to see how Mitchel would behave, and was much amused to find that he led the horse to his mother's stable, took off the saddle and bridle, put corn before him and then withdrew, locking the door and putting the key in his pocket.

He is extremely fond of walking and running about, of riding, and of bodily exercise in general. Since his sight has improved, he makes long excursions, but he always returns to his meals. When yet a child, he attempted to build small houses with turf, leaving little openings resembling windows. For hours he employed himself in the bed of the river which runs within a few yards of the house, selecting stones of a round shape, nearly of the same weight, and having a certain degree of smoothness. These he placed in a circular form on the bank, and then seated himself in the middle. He often floated pieces of wood on the water. He always liked smooth bodies. He often endeavoured to smooth sticks or rods with his teeth, or caused the boy who attended him to smooth them with a knife.

He early showed a great partiality to new clothes; after the measure is taken, nothing else seems to occupy his mind. He literally persecutes the tailor and shoemaker, until his coat or shoes are finished; he is their guest morning, noon, and night. He prefers persons well-dressed to those who are not. He never liked to take his regular meals in the kitchen, yet in coming home before dinner time he will take a potato from the servant. He particularly courts the good opinion of his sister, and if made aware that he has done wrong, or offended her or his mother, he shows evident sorrow.

In the following anecdote a peculiar proof of his kindness will be found. He had once received a severe wound in his foot, during the cure of which he usually sat by the fire, his foot resting on a low stool. More than a year afterwards a servant boy with whom he used to play happened to be confined from a similar cause. Young Mitchel, perceiving that his companion remained longer in one situation than usual, examined him attentively, and seemed quickly to discover, by the bandages on his foot, the reason of his confinement. He immediately went up to a garret, sought from amidst several other pieces of furniture the little foot-stool which had formerly supported his own wounded limb, brought it down in his hand to the kitchen, and placed the servant boy's foot gently upon it.

It is difficult to say whether he has any notion of religion. He accompanies his relations to church, behaves quietly, and kneels at family prayers. Three months after his father's death, a clergyman being in the house, on a Sunday evening, he pointed to his father's bible, and then made a sign that the family should kneel. Did he so by habit alone ?

James Mitchel has always shown an inquisitive turn of mind, great memory, and an eminent degree of judgment and reflection. Dr. Gordon said, "The knowledge which he has derived from the senses of touch, taste, and smell, seems fully as extensive as what any person of the most perfect faculties might be supposed to acquire, if he could by any contrivance be prevented from using his eyes and ears for the same period of time, from the moment of birth, and in the same retired situation of country. The train of his thoughts seems to be regulated by the same principles as that of the soundest minds. His actions neither indicate incoherence nor fatuity ; but every thing he does appears capable of being easily traced to rational motives." And I might add, *why not? since his brain is very well organized.* Indeed he always felt an internal desire to acquire knowledge. He every day explored ground where he had not been before. He wished to become acquainted with every thing that fell into

his hands. He amused himself in visiting the carpenter's or other tradesmen's shops, handling their implements, and trying to discover what they were engaged about. He knows the uses to which all common things were put, and is pleased when the use of any thing with which he is not acquainted is communicated to him.

Once, when still young, he was caught creeping on his hands and knees along a narrow wooden bridge which crossed the river at a point where the stream is rather deep and rapid. His father, wishing to discourage him from such a perilous attempt again, ordered a servant to push him off and plunge him once or twice into the river. This measure had the desired effect; but several years later, having got angry with the servant boy as they were playing together in a boat, he took him, plunged him into the water and drew him out, just as he had been served himself on the former occasion. He was soon aware of the advantages which other persons enjoyed. He sometimes proceeded alone in his excursions; but, finding any obstacle, he waited till his boy arrived and assisted him. He now goes along to great distances; for instance, from Nairn to Fort George. He easily learnt to measure time. On one occasion his mother went from home, and, he seeming anxious about her, his sister bent his head gently, as laying it on a pillow, and shut his eyes once for each night the mother was to be absent, in order to show him that he would sleep so many times before her return.

In this way too it was signified to him how many days were to pass before his new clothes would be made. His ready interpretation of signs showed a considerable share of reflection. He used natural signs, all addressed to the sight of those with whom he conversed. When hungry, he approaches his mother or sister, touches them in an expressive manner, carries his hand to his mouth, and points towards the apartment or cupboard where the eatables are usually kept. He is quite alive to proper and regular behaviour; his sister expresses her satisfaction or displeasure by different manners of touching his head or

shoulder. Gentle tapping is a sign of satisfaction; a quick slap of displeasure. He indicates riding on horseback by raising his foot and bringing the fingers of each hand together under the sole, in imitation of a stirrup. When he wants to go to bed, he inclines his head sidewards, as if to lay it on a pillow. He indicates a shoemaker by imitating with his arms a shoemaker's motion in pulling his thread; so also a tailor by the motions made in sewing.

From the preceding facts it follows that Mitchel's mind displays a great share of native strength, and is destitute only of the vehicles of its exhibition, the eyes and the ears.

It is certainly a great pity that he received no education, since none of his powers is dormant. By means of touch he might have been taught many artificial signs; but the internal activity of his mind is lost to those around him, and consequently to the study of mankind. At all events, he furnishes an evident proof that there are innate dispositions, and that the external senses are not the cause of the affective and intellectual faculties.

The external senses do not produce the means of their own gratification.

The five external senses receive and propagate impressions, which affect them agreeably or disagreeably; but they cannot produce the means of their own satisfaction. Animals, therefore, are confined to the enjoyment of those impressions presented to them by nature. They prefer the taste of one thing to that of another; they prefer particular odours, colours, sounds, but they cannot, at will, command or excite impressions calculated to gratify the senses of smell, sight, or hearing. Man alone is capable of this; he alone, in order to procure pleasure by the medium of his senses, cultivates gardens, and establishes manufactories of perfume; he alone plants flowers to gratify his smell, and to delight his eye. Man, however, has not conceived these acts by means of smell; for this sense is much more acute in the ox, horse, and dog, which cultivate no flower-gardens, and which

have no rose-water. In the same way, animals have no cookery, and no musical instruments; they cannot voluntarily charm their palate or their ears. We shall afterwards see that man possesses the power of doing so, by means of some superior intellectual faculties, which produce enjoyments to the perception of which the external senses are, however, essential.

Let us now examine the individual faculties which are erroneously attributed to, and conceived inherent in, the external senses.

I. *To the Sense of Feeling.*

The consciousness we have of the existence of the external world is considered as a prerogative of touch. It is said that man by moving finds limits or resistance to his progress, and is thereby advised of external existence. Our vision, however, finds limits as well as our motions, and, consequently, we should perceive the external world by sight, even though we did not by touch. Moreover, the sentient power resides not in the external organs, but in the mind. I cannot, therefore, conceive why the sentient being should not recognise impressions made on it in every way, mediately as well as immediately, by an obstacle to farther vision, as well as by an impediment to its endeavours to act. In either case, there is only an external impression. For what reason, too, does the sentient being, assumed unconscious of the external world, make any motion whatever? Why do insects and many animals act as soon as they are born? The tortoise and duck, scarcely hatched, run towards the water which they have never touched. How do they distinguish water from solid bodies? How can young birds be acquainted by touch with those branches upon which they perch for the first time on leaving their nests?

Observation and all nature oppose this hypothetical opinion of the schools. Man and animals are naturally much more

transfer their internal sensations, aroused by external objects, to the outward world, than to concentrate external nature within themselves. We see and hear from without, at least it seems so to us. The infant, without being instructed, turns his head towards the side whence come the sound and light which impress his ears and eyes. An afflux of blood to the optic nerves makes us see flashes of light, and to the auditory nerves tingling or other peculiar sounds. In our dreams we see landscapes, persons and objects, with which we are familiar; we hear music, we walk in peculiar places, we have a thousand different sensations. The insane hear heavenly choirs, see angels, and many looked on as sane consider their internal sensations as realities, they distinguish the figures of their genii, see spirits, &c. These and similar phenomena take place inwardly, but are, by the mind, transferred to the external world.

Again, the faculty of separating impressions from without, and the external world, from the internal sentient power, cannot be attributed to any external sense; this faculty is of a much higher nature, and exists internally as well as the one which says, "I feel; hence I am." Perceptions of impressions, recognition of the faculty which perceives, and reflections upon this acquired knowledge, are very different things. The internal faculty which knows the existence of external objects acts by means of all the external senses; the sense of touch has no preference, no monopoly. De Tracy* has demonstrated, in a very excellent manner, that the sense of touch has not the prerogative of producing the notion of the external world. He says the nerves are merely agitated by various impressions; the auditory, optic, and olfactory, as well as the tangent nerves. For what reason, then, should these last alone excite the idea of an external cause or existence?

The second prerogative attributed by Buffon, Condillac, Cuvier, Dumas and others, to the sense of touch is, that it

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* Ideologie, tom. i. p. 114.

alone produces the ideas of space, dimensions, extent, distance, figure, number, motion, and rest. But we have only to examine the functions of animals in a cursory manner, to prove this assertion quite incorrect. Animals which acquire no, or very imperfect, information from touch, still judge of distance, figure, and plurality. If the swallow and bat catch insects on the wing and flying with very great swiftness, do they not measure distance? When young birds leave their nests for the first time, do they fly against houses and trees, instead of sitting down upon a branch? Do we observe young animals which have never yet left their native place run away indifferently, whether they perceive an enemy afar off or near at hand? Animals born with imperfect eyes, or altogether blind, can neither see external objects nor measure distance; but those which are born with perfect eyes see immediately, and measure distance, figure, motion, and plurality exactly. The partridge, quail, and duck avoid from birth every object which lies in their way. It is, therefore, evident that the sense of touch has not the prerogative of producing ideas of extent, distance, form, and motion. Locke, indeed, demonstrated this truth long ago; and it is certain that not only touch and vision, but also hearing and smell, may excite ideas of distance, direction, motion, and plurality. Animals turn towards the wind, and judge of the direction in which impressions come.

Ideas of extent, form, distance, motion, and plurality, thus excited by different senses, is to me an evident proof that none of them belongs immediately to any external sense; for I consider it as an axiom in the philosophy of mind that no special faculty manifests itself by means of two or several organs. Every special faculty is attached to some one particular organ. My conclusion is confirmed by facts and direct proofs. The faculties of knowing and measuring space in general, and of distinguishing distance, forms, number, motion, and rest bear no proportion to the external senses to which they are attributed, either in animals or in man; these faculties are in-

ternal, and produce their respective sensations without being excited by the senses of seeing and touch. Birds migrate; dogs and pigeons find the places to which they are attached again, without being acquainted with the interjacent country or objects; and birds build nests like those of their kind without instruction: these acts follow from internal faculties, and without any external excitation from touch or sight. Finally, the physiology of the brain shows that there exist particular organs of powers, the manifestations of which are in proportion to their respective apparatuses. These faculties, therefore, must be separated from the functions of the external senses, and attributed to particular internal organs.

The third supposed prerogative of touch is that it is the surest of all, and the rectifier and correcter of the other senses. In treating of the external senses in general, I have demonstrated that no sense acquires its faculty by means of another, but that each has it from nature independently; that all are subject to particular laws; and that their functions are perfect or imperfect according to the organization of their proper apparatus. Thus, from this consideration it follows, that touch neither produces the faculties of the other senses, nor rectifies their errors. Indeed, it is easy to prove, both by the healthy and the diseased state, that touch is not surer than any other sense, and that it does not rectify the other senses, any more than it is rectified by them.

If we cross two fingers, and touch a round body, a pebble, for instance, or a pea, we seem to feel two bodies. A thin and flexible piece of paper between the fore finger and thumb is not felt. In various diseases individuals fancy they receive impressions from without; they feel warm or cold, tickling, creeping, and other sensations; just as they hear voices which have no external existence, and are produced by an internal cause. Whoever will reflect on these considerations, combined with those exposed when speaking of the mutual rectification

of the senses, may perceive that touch has no superiority over any other sense.

I have already said, that some physiologists and philosophers believe that the sense of touch produces many of the instinctive labours observed among animals, and the mechanical arts among men. But neither are the instinctive labours of animals, nor the mechanical arts of man, in any proportion to the acuteness of touch, or to the perfection of the external instruments. A great number of insects exhibit peculiar instincts before their antennæ or instruments of touch are developed. Many animals have those instruments to which peculiar faculties are attributed, without being possessed of the corresponding functions. Would it not be more natural to suppose that apes and monkeys should possess the power of constructing because they have hands, than that the beaver should build because it has a tail? Monkeys, indeed, have hands, they can put wood on the fire, they also are very sensible to cold and warmth, but have they understanding enough to keep up the fire? According to the opinion announced, insects, crawfish, lobsters, and especially cuttlefish, ought to have exact ideas of extension, of size, and of geometry, in consequence of their numerous and perfect organs of touch.

The external instruments, moreover, are often similar, while the functions are quite different. There is a great variety in the form and texture of the cobwebs which different species of spiders made to catch flies. What diversity of structure in the nests of birds whose bills are similar! Animals of the same genus vary much in their food and in their manner of living. The large titmouse builds its nest in hollow trees; the long-tailed titmouse in clefts of branches; the bearded titmouse among reeds; the titmouse of Poland suspends its delicate and curious dwelling from a slender bough; the cuckoo, again, though endowed with all the requisites for building, constructs no nest whatever. The hare and rabbit have feet exceed-

ingly alike, yet the hare lies in the open fields, while the rabbit makes a burrow.

On the contrary, similar acts are performed by animals with a variety of dissimilar instruments. The proboscis is to the elephant what the hand is to man and to the monkey. It is by means of the bill that the swallow attaches her nest to the wall, and that the thrush cements the interior of hers, while it is by means of his tail that the beaver covers his hut with mud. The hands of monkeys, and the feet of parrots and squirrels, are certainly different; yet all hold up their food when they eat; the hog ploughs the earth with his snout, and the dog scratches it with his feet, in digging up truffles. In the same way similar internal faculties produce similar effects by means of perfectly different instruments.

Again, man and animals exhibit many faculties which cannot be considered as effects of external instruments. Who, for example, can show, from any external organ, that crows should live in society, and magpies in pairs—that the cuckoo and chamois should be wild by nature, and the pigeon and goat tameable—that bustards and cranes should place sentinels—that ants should gather provisions, &c.?

Finally, even in the human kind, there is no proportion between manifestations of faculties and perfection of external instruments. If man owe his arts to his hands, why do not idiots invent? Why do painters drop the pencil, sculptors the chisel, and architects the rule and compass, as soon as their understanding is fatigued? and why do many bring forth stupendous works by the assistance of crippled hands or of stumps? Who can measure the architectural talent from the conformation of the hands? These considerations prove that the external instruments do not produce the faculties. I do not however deny their importance; I should even admit some relation between internal faculties and external instruments. Without instruments the internal faculties could not manifest themselves; without muscles, the will could not move a limb; with-

out hands, or some equivalent, we could not seize any object; carnivorous animals could not destroy without claws and teeth; without these instruments, therefore, they could not subsist. Moreover, as the instruments are more perfect, the manifestations of internal faculties are also more perfect. Nevertheless, it is unquestionable that the propensities and intellectual faculties which make use of the external instruments must be derived from within.

We have still to consider whether or not acuteness of feeling produces the instinctive labours of animals and the mechanical arts of man. Experience proves that it does not. There is no proportion between fineness of skin or acuteness of feeling, and manifestation of the faculties of the mind. Some individuals have rough hands and an obtuse feeling, and yet produce surprising works. No artist ever judged of the capacity of his pupils from this acuteness of touch. It is even still a question whether man's sense of touch is more acute than that of animals. It is generally believed to be so, because his skin is destitute of hair and covered with a very thin epidermis only, while the lower animals are clothed with hair or feathers. There are some tribes, however, which have no hair, as the elephant, the Turkish dog, snails, &c.; and whose sense of feeling is very acute. Other animals, though covered with hair, immediately feel the smallest insects which alight on their bodies. Finally it is even impossible to conclude that because the skin is covered with hair feeling is less acute. Sometimes in diseases the hairy scalp of man grows extremely sensible, and the least movement of the hair gives excessive pain; the epidermis is thickest at the points of our fingers, yet there feeling is considered as the most acute. Consequently, the nerves of touch, though covered with hair, may be even more sensible than when destitute of such a covering, and it is by no means obvious that the feeling of man is more acute than that of animals.

The wisdom, then, of Solon, Socrates, and Plato, and the

masterly productions of Homer, Euclid, Raphael, and others, were not the result of their mere hands; nor are the surprising instincts of animals the effects of their antennæ, feet, teeth, probosces, or tails. I however repeat that it must be allowed that the external instruments, though they are not in proportion to the internal faculties, cannot be in contradiction to them; and that the internal faculties perform their functions with greater facility and more accuracy as the external instruments are more perfect. Therefore the hand of man, which is composed of so many moveable parts, capable at every moment of changing their direction, and of grasping external bodies, is fitter for appreciating tactile qualities than the feet of birds invested with scales, or of quadrupeds covered with a horny substance. Yet it is nevertheless certain that the external instruments are never the cause of the internal faculties.

It may still be asked whether feeling produces ideas of consistency, of hardness, of softness, of solidity and fluidity, of weight and resistance. I think it does not. For the mind, to examine these qualities of bodies, employs the muscular system, rather than the sense of feeling properly so called. There is also no proportion between the faculty of measuring such qualities and the sense of feeling or the muscular system. Moreover, the sense of feeling being lost, if the muscular power remain, we may perceive weight and consistency. Now the muscles are excited by internal causes, and therefore ideas of weight, resistance, and consistency, are, in my opinion, the result of some internal faculty. I once for all observe, generally, that when any function results from the active state of an external sense the faculty which conceives the idea is internal. We have seen above, that the faculties which take cognizance of extent and size, form and number, are internal. In this manner we may also conceive how internal faculties employ different external senses, if that be possible, and how some-

times they can make use only of a single sense. The mind, for instance, wishes to move the body from one place to another, and this can be done only by means of the muscular system; the mind wishes to perceive music, and this also can be done only by means of the auditory nerve: but the mind wishes to perceive the size or form of a body, and this may then be done either by the sense of sight or by that of feeling. Notwithstanding these modifications, it remains always certain that every re-action of the mind upon external bodies has its cause in some internal faculty, while the sensations which result from the passive state of the five external senses constitute their immediate sphere of activity.

II. *To Taste.*

No feeling and no intellectual faculty having been supposed to be derived from the sense of taste, there is no occasion to speak of this sense here.

III. *To Smell.*

A great number of physiologists ascribe to the sense of smell the surprising faculty by means of which many animals again discover and return to their dwellings from very great distances; but there are many facts of this kind which cannot be explained by smell alone. A dog, for example, at the end of several months, and from a distance of more than a hundred leagues, finds his former dwelling and master, though he has been carried away in a coach; though it has rained repeatedly during this interval of time; though he has gone by water and comes back by land; though he is obliged to make circuits instead of taking the nearest way; and though the wind has changed in all directions. Pigeons, likewise, though transported to a distance of twenty or fifty leagues, and shut up for several weeks, return to their former cotes; the falcon of Iceland, confined for many months, often flies

away in the first moment of its liberation. These and similar phenomena cannot be explained by the sense of smell. It is necessary to admit another superior faculty, sometimes called the sixth sense.

IV. *To Hearing.*

A very common opinion is that music and language are results of the sense of hearing. But this is not the case. I shall first show that this sense cannot produce music. Le Cat, Ackermann, and others, think that the cochlea is the most important part of the ear, and the principal instrument of the musical faculty. The latter has accordingly maintained that man alone had the cochlea. Different quadrupeds, however, possess this part even more perfect than man, as sheep, cats, dogs, and hogs; and these animals certainly are not fond of music. Hence the opinion of Ackermann and of Le Cat is erroneous. Besides, birds, whose ear is almost destitute of this part, sing. Le Cat, aware of this contradiction, answered, that the whole skull in birds is more sonorous than in quadrupeds, because it is less covered with muscles; he thinks that, if nature had joined a cochlea in addition, they would have been still more sensible to melodious sounds, and as passionately fond of music as almost all animals are of food; but, continues he, as birds are destitute of the cochlea, their musical talent depends more on their throat. Le Cat is mistaken: there is a great number of singing birds whose skulls are covered proportionately with more muscles than those of some quadrupeds; the ant-eater, for instance. The heads of the goldfinch, bullfinch, chaffinch, linnet, &c., are covered with considerable muscles, while that of the green wood-pecker, which certainly is not a melodious bird, is almost destitute of them. The heads of the hoarse March thrush, of the monotonous cuckoo, of the miserable chatterer of Bohemia, &c., are not covered with more muscles than the skulls of the sweet mocking bird, of the melodious blackbird, and of the vineyard

thrush, with its delightful song. If we suppose that the whole skull of birds is sonorous, the only consequence to be drawn from it would be that a weak sound is greatly strengthened in them; but why certain birds are so fond of singing, and why some nightingales continue their song till they die from exhaustion, would be quite inexplicable.

Hearing in general cannot produce music, because there is no proportion either in animals or in man between it and musical talents. Many hear very acutely, and are yet insensible to music. Among birds, the female hears as well as the male; if hearing then produce music, why does not she also sing? Among men there are some whose hearing is very obtuse, and whose talent for music is very considerable. Finally, hearing cannot produce music, because hearing perceives only tones which are already produced. The first musician produced music from an internal impulse, and that music of course he had never previously heard. Singing birds, moreover, which have been hatched by strange females, sing naturally, and without any instruction, the song of their species, as soon as the internal organ of the faculty is active. Hence the males of every species preserve their natural song though they have been brought up in the society of individuals of different kinds; hence also musicians who have lost their hearing continue to compose; hence likewise the deaf and dumb have an innate feeling of measure and cadence.

Le Cat confounds the crying of dogs at the sound of a hunting horn, and the stamping and neighing of horses at the blast of a trumpet, with the faculty of music. If it were, we must allow that fishes, reptiles, and even spiders which are allured by sound are sensible to music. Buffon, Dumas, Bichat, and others, think that the talent of music depends on the equality of the power of hearing with both ears. If, however, inequality of power in the ears sufficed to destroy the perfection of the musical ear, a good musician would be extremely rare; for by far the greatest number of men hear better with one ear

than with the other. From all this it follows that hearing does not produce music, but it is, however, necessary to perceive and to execute it. But this consideration belongs to the chapter on the sphere of activity of each faculty, and here I intend only to prove that hearing cannot produce music.

Some authors derive music and the vocal powers of birds from the larynx. But, did the larynx give the instinct to sing, why do not all animals endowed with this part manifest the faculty? Cuvier has also found that the larynx of many birds which sing, and of others which do not, is similar in structure. What difference is there between the throats of the females and males of the same species? Is there even in man any proportion between the agreeableness of the voice and musical talents? Nay, have not many individuals great musical talent and little voice? and do not others sing very agreeably without excelling in music? Music, therefore, is neither the result of hearing nor of the voice.

It is also a very common opinion that hearing alone, or hearing and voice conjointly, produce the faculty of speech. The best way of refuting this error is to enquire in what language consists, and how it is produced. Language in general is the medium by which sensations and ideas are communicated, and this may be effected by sounds, gestures, or other signs. Language then may be divided into two kinds; natural, and artificial or conventional.

It is a natural law that the internal faculties of man and animals, as soon as they are active, manifest themselves by the media between them and the external world,—the five external senses, and muscular motion. These external manifestations take place according to determinate laws, and, though modified in every species of animal, they are always conformable to certain kinds of sensations or ideas. The horse neighs, the lamb bleats, the cow lows, the child cries, &c., according to their wants. This natural language is general, because all animals require to communicate their sensations, were it only

for sexual purposes. We generally observe that animals which live in society communicate their wants, and the approach of danger or of an enemy. To what purpose their calls, their placing sentinels, their alarms, if they did not understand one another? Unless this were the case, hunters could not deceive them by imitating their voice or manner of calling. We must therefore allow with George Le Roi, Condillac, Dupont, De Nemours, De Tracy, and many others, that animals have their peculiar language, and that this language is proportionate to their faculties.

It may be objected that the language of animals has no words. They have only natural language, which consists partly of sounds and partly of gestures, like the natural language of man, which is also destitute of words. But man has, besides his natural language, the faculty of producing arbitrary signs, whether sounds or gestures. Animals, on the contrary, are destitute of the power of producing arbitrary signs, and have only that of learning those of man. Hence, cats, dogs, horses, oxen, &c., learn the language of every nation as far as they have the sensations expressed. Thus a dog may learn to understand the signification of *eat*, *manger*, or *essen;* but no animal can understand a sign, either natural or arbitrary, if destitute of the related sensation or idea. I shall hereafter consider the faculty which produces arbitrary signs, and that which acquires them. I here intend only to prove that neither hearing nor voice produces the faculty of speech, and that both stand in the same relation to language as they do to music, that is, that they are only certain intermedia or means of manifestation. There are animals which can pronounce words, imitate various sounds, and hear very well, but which, nevertheless, have no arbitrary language. Some imperfect idiots also hear and pronounce with facility the words taught them, but cannot maintain a conversation. Their mode of communication or their language becomes consistent in proportion to their internal faculties.

Moreover, if orators and poets become insane, their eloquence is changed into incoherent raving. It is therefore evident that the faculty of speech does not result primitively from the voice and hearing.

Besides the faculties of speech and music, there are others still which act upon the external world by means of hearing, and which are commonly attributed to this sense. Here I must mention an error which was once very common, and into which even Kant and Herder have fallen; namely, that it is impossible to communicate any abstract notion to the deaf and dumb. Le Cat says that the deaf are more unfortunate than the blind, because many truths are heard and very few are seen. Herder even thought that the deaf and dumb imitate all they see done, whether good or evil. These and similar erroneous opinions result partly from the common mistake that our sensations and notions are produced by the external senses, that nothing exists in the mind except what passes by them, and partly also from supposing that arbitrary vocal language produces sensations and ideas. It is, however, certain that all the internal faculties may exist without hearing; and, consequently, that deaf persons in whom this sense alone is wanting may manifest all the other faculties. They are destitute only of the means of communication hearing supplies, and are, therefore, obliged to make use of others. Hence they impart their sensations and ideas, that is, they speak, by gestures.

V. *To Sight.*

We have still to examine whether sight produces any intellectual faculty. It is commonly supposed that the art of painting derives from the sense of sight; and it is certainly true that eyes are necessary to perceive colours, as are ears to perceive sounds; but the art of painting no more consists in the perception of colours than music in the apprehension of sounds. Sight, therefore, and the faculty of painting bear no proportion

to each other. The sight of many animals is more perfect than that of man, yet they do not paint; and, even among mankind, the talent of painting cannot be measured by the acuteness of sight. Great painters never attribute their power to their eyes. They say, it is not the eye, but the understanding which perceives the harmony of colours.

From all these considerations it follows that many intellectual faculties which have been attributed to the five external senses do not belong to them.

SPHERE OF ACTIVITY OF THE EXTERNAL SENSES.

The external senses destined to bring man and animals into communication with the external world may be divided into two sorts. By means of the first, two in number, we are acquainted with external bodies when they touch the sentient organs immediately. These are touch and taste. The second, including the remaining senses, perceives remote bodies. I do not say that perception or sensation can take place in a sense which is not affected by some immediate impression: this is an indispensable condition; but to say that we are acquainted with remote bodies and their qualities is not to say that we perceive without impressions. This latter phrase would be contradictory and absurd. We perceive remote bodies either by particles detached from them, and carried to a sentient organ, as to the olfactory nerve, or we perceive them by intermedia, as light and air. In both cases it is certain that man and animals become acquainted with remote bodies and their qualities.

In general only five external senses are spoken of, but it is necessary to speak with greater precision. I therefore first separate the general expression *sensation* from the determinate sensation of hunger and thirst; secondly from voluntary motion, to which voice belongs; and, in the third place, from the sense of feeling as well as from touch. I consider the word sensation as an expression altogether general. Every act of conscious-

ness, or every perception of an impression, whether external or internal, is sensation. Hunger and thirst, then, constitute a particular class of sensations attached to particular nerves; and voluntary motion ought not to be confounded with the sense of feeling, as is generally done. It seems to me that the nerves of motion and feeling are quite different. Nay, I am convinced of the existence of these two sorts of nerves by anatomical, physiological, and pathological proofs. This difference is spoken of by Herophilus, who believed that it must exist, as voluntary motion is sometimes impossible, while feeling remains or is even increased in acuteness, and as feeling is oftentimes lost while voluntary motion continues. In modern days, Reil has stated that the medulla of the nerves produces sensation, and their investment motion; but entire nerves—nerves consisting of both these parts—are distributed to the muscles in which there is motion, and to the skin in which there is sensation. Besides the pathological proof of the difference between the nerves of motion and of feeling, it is to be considered that the same nervous fibres do not go to the muscles and to the skin, and that each of these parts performs peculiar functions. The nerves necessary to motion cannot propagate the impressions of the nerves of feeling, nor these the impressions of the nerves of motion. Muscles only feel pain and fatigue, and there is no proportion between these and the sense of feeling. It is possible to be fatigued and to have acute feeling. Moreover, muscles receive their impressions from within, and the nerves of feeling theirs from without. Again, there is no proportion between the size of muscles and the acuteness of feeling. The nerves of feeling are assisted by those of motion no otherwise than are the nerves of all the other senses: if internal faculties act upon external impressions by means of an external sense, they employ the organs of motion to enable the sense to receive the impressions. Is not the tongue provided with three kinds of nerves, viz., of motion, of feeling, and of taste? According to this view, the spinal marrow must

consist of nerves of motion, and of nerves of feeling, and the greater number of the pretended cerebral nerves are destined to motion and feeling. In the year 1815, I gave these statements in the two first editions of the Physiognomical System, p. 23. In my French work, entitled "*Phrénologie,*" published in 1818, chapter on the external senses, I add to the preceding remarks, "*Il reste à demontrer que les différentes racines des pairs des nerfs de la colonne vertébrale fournissent les nerfs du mouvement et du toucher, de même que cela a lieu pour le goût, le mouvement et le sens du toucher de la langue.*" The experiments of Mr. Charles Bell, detailed in a paper in the Transactions of the Royal Society of London, of the year 1821, demonstrate the principle of the nerves of motion and of feeling distributed to the face; the facial nerve being that of motion, and the branches of the fifth pair of feeling and of taste. Since that time, M. Magendie, from experiments made upon living animals, infers that the dorsal or posterior roots of the spinal cord are nerves of feeling, while the abdominal or anterior are those of motion. Notwithstanding what has been done, it seems to me that this object is not yet sufficiently clear, since it is certain that many fibres of the posterior roots of the spinal nerves go to the muscles. Moreover, the posterior roots are larger in size than the anterior, and the muscular functions seem to require a larger share of nervous influence than the sense of feeling alone. I therefore only admit that the influence of the will over the muscles is exerted by means of the anterior roots; but as these evidently consist of two portions, and as some of their fibres go to muscles, it is still necessary to examine whether both portions or only one is the instrument of *voluntary* influence on the muscles, at the same time that the posterior roots might also contribute to give power.

Thus the functions of the muscles exist independently of the five external senses, and are only combined with these that they may be aided in accomplishing their offices. Moreover,

from the preceding considerations, it results that the greater number of functions, commonly attributed to the senses, do not belong to them, but depend on the existence of internal faculties. The external senses, as intermedia of the exhibition of mental powers, which they are in fact, have certain functions that may be called *mediate*, while those which the senses themselves suffice to perform, may be styled *immediate*. In other words, the immediate perceptions depend on the external senses, while the mediate functions permit the acquisition of determinate ideas conceived by internal faculties.

According to the observations in the first section of this work on sensibility, the brain seems to be necessary to every kind of perception, even to that of the immediate functions of the external senses; but it is not yet ascertained, though it is probable, that one fundamental power inherent in a particular part of the brain, knows, and conceives as sensations, all the varied impressions made on the external senses. Some phrenologists think that each external sense has a peculiar portion of brain for this end, and that the combined action of its nerve and of this cerebral part is necessary to the accomplishment of its functions,—that the nerve of taste and a portion of brain, for instance, are necessary to perceive savours; the olfactory nerve and a cerebral part to distinguish odours, &c. I do not believe that consciousness happens without brain, but I see no reason to surmise that the immediate functions of each external sense require a particular portion of the brain in order to be recognised as determinate sensations.

Let us now consider the immediate functions of each individual sense.

Immediate Functions of the Sense of Feeling.

Feeling is the most extensive of all the senses; it is continued not only over the whole external surface of the body, but even over the intestinal canal. It produces the nost general perceptions of pain and pleasure, sensations of temperature, of

dryness and moisture. All its other functions, which procure notions of existing objects and their relations, are only mediate. In my opinion, even the ideas of roughness and smoothness belong to an internal faculty, namely configuration. The mediate function of the sense of feeling may be called *touch,* of which the sphere of activity is very considerable and important: it is particularly combined with the nerves of voluntary motion, and the two kinds together may assist the functions of all internal faculties, as well affective as intellectual. Hence the reason why nerves of feeling and motion are most intimately connected with the organs of the affective and intellectual faculties. The five external senses, it may indeed be readily conceived, should be in connexion with those cerebral organs which they particularly assist; and further, as the nerves of motion and of feeling may aid all internal faculties, that they should be in connexion with all the internal organs, just as the nerves of feeling and motion, mutually aidant, are connected with each other.

Taste.

Taste is the second sense by means of which man and animals are made acquainted with external bodies, when these touch the sentient organ immediately. After feeling, this sense seems to be the most general and the most indispensable of all to living beings which consciously take food. It seems also that it is active in early life. The fifth pair of nerves, branches of which are distributed to the membrane covering the palate, the velum pendulum, the pharynx, and chiefly to the tongue, is of great size in new-born children, as are the nerves of motion and feeling also.

An opinion commonly prevails that the acuteness of taste depends not only on the nervous papillæ of the tongue, but also on its flexibility, softness, and moisture. Ackermann, who derives the perfection of the human mind from the acuteness of the five senses, asserts that the nerves of taste are proportionally more considerable in man than in animals; that the tongue of

man is the most flexible and soft, and that its nervous papillæ are covered with the finest skin. In many animals, however, as in the dog, monkey, &c., the skin of the tongue is as thin and fine, and its structure as flexible as in man. The mobility of the tongue has, indeed, less relation to the taste than to the function of speech. The principal condition to an acute taste is certainly large gustatory nerves spread over a considerable surface; but, in this point, many animals surpass man. In some the lingual nerve, as well as the whole fifth pair, is much larger than in the human kind; the nervous papillæ of the tongue are also more numerous and their apices more extensive. Though the tongue of several species is covered with a very rough skin, they distinguish and select certain plants conformable to their taste, and reject others which are contrary to it. Moreover, when we see that eating is to animals the most exquisite and permanent pleasure, and that great numbers pass almost their entire existence in eating or ruminating, we shall with difficulty deny them a taste more perfect than that of man. He, therefore, who expects more considerable intellectual faculties from more perfect organs of taste ought at least to show that dogs, horses, and oxen have employed those powers to improve or invent means of gratifying their palate.

I cannot agree with those naturalists who maintain that the taste of birds is very obtuse. Blumenbach has shown that the organ of taste is large, and the sense very exquisite in the duck. A great number of birds do not swallow their food suddenly; the titmouse, for example, laps it. The greater number of birds which live upon insects, seeds, and berries, crush and bruise them. If we present the canary bird, the bullfinch, or nightingale with different sorts of food, each of them will choose that which is most agreeable. If we give ants' eggs to young nightingales, many rather die of hunger than eat, because unacquainted with that sort of food; and if we even put them into their bill, they commonly drop them; the eggs, if crushed, however, are swallowed with the greatest avidity: it is evident

from this that their taste is very acute. Even the birds which swallow their food suddenly, as fowls, pigeons, and others, distinguish different berries and seeds with the extremity of their bill. If we mix the seed of vetches with that of robinia caragana, pigeons and fowls will pick them up indiscriminately, but will always throw away the latter. These birds therefore, like others, prefer one sort of food. Tame storks, accustomed to catch rats and mice thrown towards them, jerk these several times into the air and catch them again in their bill, in order to crush before swallowing them. If we cast a toad to them, however, they will catch still, but immediately drop it. They also eat bees and large flies greedily; but regularly reject any other insect which does not please their palate. Such also is the case with swallows and other birds which live on insects.

These observations render it improbable that every insoluble body is insipid, or that every substance to affect the organ of taste must be dissolved in the mucus which covers the tongue. In many physiological writings, the axiom of chemistry, *corpora non agunt nisi soluta,* is applied to the organ of taste. "The tongue," says Richerand, "is covered by a mucous, whitish yellow, or bilious slime. This covering, more or less thick, prevents the immediate contact of sapid particles, and we have only a false idea of tastes. All aliments seem bitter if a bilious disposition exist, or insipid if there be a superabundance of mucus." The tongue, however, it appears, may perceive many spirituous, oleaginous, or other impressions produced by seeds and insects, without their being dissolved and mixed with the mucus which covers it.

M. Dumeril, Professor of Physiology at Paris, maintains (in an essay on the smell of fishes) that fishes are destitute of taste; this sense, according to him, being supplied by that of smell. Fishes, says he, have not the hypoglossal nerve, and the continual pressure of the water must blunt the sensibility of the lingual nerve. Now supposing that fishes were destitute of the hypoglossal nerve, it would not follow that they had no taste;

for the hypoglossal serves only for the motion of the tongue, while a branch of the fifth pair which exists in fishes is the sole organ of taste. The tongues of many fishes are covered with numerous nervous papillæ, and at the point are even movable, flexible, and soft. Hence there is not only no anatomical reason to deny taste to fishes, but it is even from their possessing this sense that they may be taken with a bait. Again, if the pressure of water blunt their taste, why should it not blunt their smell also? But pressure produces no such effect; the sole of the foot does not lose its sensibility, though pressed on during a long life. In short, this opinion of Dumeril seems more remarkable for its singularity than for its correctness.

The very lowest tribes of the animal world must also have nerves of taste. Insects prefer different kinds of food, though their gustatory nerves have not yet been discovered.

Neither in man nor in animals can taste be considered as an infallible guide to the wholesomeness of the body tasted. Unsavoury articles may be wholesome, while substances which please the palate may act as poisons.

The taste of the sick often affords an indication in distinguishing or in aiding nature in the cure of disease; no good physician, however, will have unbounded confidence in it. The sense of taste is necessarily in most intimate relationship with the whole digestive system. I have already mentioned that this sense is modified in different kinds of animals, and in different individuals of the same kind, even in different ages, and in the healthy or diseased state. As the organ of taste is the first developed, so it seems to lose its activity last. Old persons commonly love good cheer, which is also necessary for them. When sight has failed, when the ear no longer does its office, when the skin has become stiff and almost insensible, the aged may often be seen eating and drinking as heartily and with as much pleasure as their grand-children.

The sphere of activity of this sense is confined to sensations of taste; that is, it perceives only impressions of savour. *Me-*

diately, it assists nutrition. The nerves of taste have the most intimate connexion with those necessary to the motion of the jaws, with those of the organ of voice, and with the glossopharyngeal nerve. Accordingly, the organs on which these nerves are expanded exert the greatest mutual influence.

Smell.

By means of smell the external world begins to act upon man and animals from a distance. Odorous particles detached inform them of the existence of particular bodies. Several physiologists regard smell as a completion or a finer and higher degree of taste. But the system of the olfactory nerve is particular. It is, as it were, the explorer and the guide of the sense of taste, and must exist very low in the scale; insects are attracted by odours, but their olfactory nerve has not been discovered.

Dumeril, supposing fishes to have no taste, regards smell as its substitute; and, in support of his opinion, maintains that odoriferous particles cannot be transmitted by water. We have already seen that the organ of taste exists in fishes, and it is not probable that nature has produced any organic apparatus without an appropriate object. It is besides strange to maintain that odoriferous particles are not transmitted by water, as fish of various sorts, lobsters, &c., are taken by bait. It is remarkable that this sense does not exist in cetaceous animals, which occupy so high a place in the scale of being. Dumeril thinks also that their taste supplies the place of smell.

It is admitted that many animals excel man in acuteness of smell; their olfactory apparatus being much larger. But this occurs indifferently among the most stupid and the most intelligent animals—in oxen and hogs, in dogs and horses.

Cuvier maintains that the olfactory nerve is larger in carnivorous than in herbivorous animals; but there is no relation between the acuteness of smell, and the instinct to eat flesh or vegetables. Man who is omnivorous, and the sea-calf which

lives only on fish, have both very small olfactory nerves. The turtle, mole, sheep, ox, horse, &c., however different their food is, have an olfactory nerve proportionally larger than the wolf, dog, tiger, &c. Comparative anatomy, therefore, as also comparative physiology, oppose Cuvier's opinion. Many hundreds of plants supply herbivorous animals with food, while the carnivora live commonly upon a smaller variety of flesh; to distinguish their food, therefore, the organ of smell in herbivorous should be larger than in carnivorous animals. Moreover, if nature endowed carnivorous animals with a very acute smell for the purpose of discovering their prey, it is improbable that she refused the weak victim an equal advantage to enable it to detect and escape its enemies.

Odours act powerfully upon the brain; we therefore apply stimuli to the olfactory nerves, which often revive sensibility in cases of suspended animation.

The smell in its immediate functions perceives odorous particles emanating from external bodies, and thereby informs man and animals of the existence of their aliments. All functions besides are mediate. It assists the faculty which conceives the existence of the world; admonishes animals of the proximity of friends or of enemies; and brings those which live solitary together for sexual purposes.

The olfactory nerve seems to have a more particular connexion with the anterior lobes and convolutions of the brain situated sidewards and outwards. In animals it chiefly assists the faculty which knows individuals. The nose is also near the mouth, taste and smell bearing such relations one to another.

Hearing.

Hearing is the second sense which makes man and animals acquainted with remote existencies, and is the first which perceives external objects by an intermedium, the air. The audi-

tory nerve is found from man down to the cuttle-fish; farther it has not been distinguished, though several animals lower in the scale are not destitute of hearing. The auditory apparatus is more complex as animals are more perfect, and this is the case both with the external and internal ear. Except Ackermann, all physiologists allow that many animals surpass man in the faculty of hearing. That physiologist, however, deriving human intellectual superiority solely from the external senses, asserts that the hearing of man is the most perfect on account of the cochlea of his ear, which, according to him, is the most essential part, and is wanting in animals. But this assertion may be refuted, both anatomically and physiologically. First, it is certain that the organ of hearing is more perfect in many animals than in man; that their external ear is larger, more movable, and capable of being turned in all directions, and opposed to soniferous undulations. Moreover, the auditory apparatus of many animals has large cavities, which increase the sonorous vibrations, and which cannot be confounded with the mastoid process of man; in some these are empty, in others they are divided into compartments, and in the ox are composed of many concentric partitions. The auditory nerve is also much larger in many animals, as the ox, horse, stag, sheep, &c., than in man; and the cochlea not only exists among them, but is in many even more perfect than in the human kind. Hence it is anatomically proved that the organ of hearing is in many animals larger and more perfect than in man. The same may be demonstrated physiologically. In observing the functions of animals, we may convince ourselves that many of them perceive sounds which are imperceptible to man.

The sense of hearing is not active in new-born children, but it improves by degrees, and in proportion as its apparatus is developed. In the same way the auditory power declines in proportion as the vigour of the organ decreases. Several authors maintain that the deafness of old persons depends on the blunted sensibility of the auditory nerve; they think that

repeated impressions exhaust sensibility. It is, indeed, true that sensibility is blunted and exhausted by too great exercise; but I think that, in the ordinary state of health, dullness of hearing in old persons depends on the decrease of the auditory apparatus. In the young and healthy, the auditory nerve is expanded in a humour which occupies the cavities of the internal ear; this in the aged diminishes at the same time that the nerve itself decreases. Hence, when Pinel, during the severe winter of 1798, caused the skulls of several old women who had lost their hearing to be frozen and then opened, he found the cavities of the internal ear perfectly empty, while they were filled with ice in younger persons who had died with this sense unimpaired.

The immediate functions of the sense of hearing are confined to the perception of sounds; yet it assists a great number of internal faculties which are commonly attributed to it. We may conceive that the sense of hearing is modified in different beings, and bears relation to the internal faculties which act by its means; precisely as even external objects are in harmony with internal faculties, or internal faculties with external objects; as the laws of vibrations, for instance, though they exist in external vibrating objects, are conformable to the laws of the internal faculty of tune; or as size, number, and succession, which exist in the external world, are in relation to certain internal faculties.

The sense of hearing potently aids the affective, as well as the intellectual faculties of space, individuality, tune, speech, and, through the instrumentality of these, all the other powers of the mind. The auditory nerve, indeed, has a nearer connexion with the organs of the feelings than of the intellectual faculties; it embraces the nervous bundle of the cerebellum, and is connected with the vocal nerves; the voice called forth by command of the feelings, as well as the natural language of their activity, is more energetic than when summoned by the intellectual faculties to aid them in the expression of their desires.

Sight.

Sight is the second sense which informs man and animals of remote objects by means of an intermedium—light. Those who attribute the excellence of man's intellectual faculties to the perfection of his senses maintain that his sight is better than that of animals. They consider this superiority as a result of the greater distinctness with which they say objects are seen by man; to the transparency of the diaphanous parts of his eye; to the irritability of his iris, and to the position of his crystalline lens. Richerand even believes that the pigmentum nigrum impedes and disturbs the distinctness of vision; and that perhaps on this account animals have false and exaggerated ideas of the power of man. Experience answers these errors. The iris of many animals is very moveable, and they see during both the day and night, and to greater distances than man. The falcon perceives the heron, still invisible to man; the eagle, beyond the reach of human sight, sees a hare upon the ground; the turkey and fowl recognise the far-distant bird of prey, and warn their surrounding broods, when it is impossible for man to distinguish the enemy. It cannot be denied, therefore, that the sense of sight is more acute in many animals than in man.

None of the senses has occupied physiologists and philosophers more than sight and touch; but these have also been the subjects of the greatest number of errors. Many false notions have been and are still current, in regard to vision. This sense has been said to acquire its faculty either by touch or by habit. But I have already proved, in speaking of the generalities of the external senses, that no one acquires its faculty from any other or from habit. Vision depends on the organization of the eye; and, according to this, is it weak, energetic, good or bad. Some animals enter the world with perfect eyes, and they see accurately from the first. The butterfly and honey-bee fly on the first attempt through the

fields, from flower to flower; and the partridge and chicken as soon as they have left the shell, run through stubble and corn, while other animals born blind distinguish size, shape, and distance of bodies, only by slow degrees. This is the case in the human kind. I cannot insist too forcibly on the truth: every sense has its own laws, and its functions depend on the state of its organization. In the looking-glass we must see ourselves and other objects enlarged, diminished, lengthened, shortened, multiplied, near, distant, and so forth, according to the laws of the reflection of light.

Some also maintain that without the sense of touch our eyes would represent all objects reversed and double; and that the external world would seem to be in the eyes, because it is painted on the retina. Objects are actually reversed in the eyes; but, as Berkley and Condillac have elucidated, they are not painted on the retina; that nervous expansion is only impinged on by the rays of light. How or why we see objects upright is not, however, explained. An internal faculty makes animals acquainted with the external world, and they are more disposed to transfer all internal sensations and ideas of external bodies to the outward world, than to concentrate impressions of these inwardly. According to a law of nature, the impressions of our senses are not merely transferred into the external world, but are even carried to the places whence they come. We deem the sonorous body to be in the direction from whence come vibrations of the air. And, if animals take wind, they do not look for the impressions received in a direction opposite to that whence they proceed. Impressions of light are also referred to the place whence they emanate; and, consequently, such as arrive from above are referred upwards, those from below downwards, and the object is thus seen in its right position.

No one recollects having in his infancy seen any object reversed, and natural history presents no such example in animals. According to the absurdities into which speculators

have run, young birds ought to take the root of a tree for its top. It is unfortunate that natural philosophers and physiologists, in examining the functions of the senses, have confined their reasonings to man alone, thus excluding animals entirely. I have now spoken of vision being single, although the impressions are double; of the eye's capacity to distinguish distance; and shown that animals' inability to measure distances exactly between themselves and external bodies only occurs when their eyes are imperfect. Thus the organ of vision has its peculiar faculty, whose manifestations depend on the state of the eye's organization; and vision, like every other sense, is subject to invariable laws of its own. A straight stick, half plunged in water, must needs appear crooked. In a vessel filled with water, we see a stone or other body at the bottom, which is invisible, circumstances remaining the same, with the exception of the vessel being empty. The most learned man, notwithstanding all conviction to the contrary, sees images behind the looking-glass, as do parrots and monkeys. We see our persons reversed in the concavity of a spoon, our right hand on the left side, and our left on the right; but in a conic mirror, convex in the circumference and concave from the basis to the apex, we see our persons also reversed, but the right side opposite the right, and the left opposite the left, as in a common looking-glass. We know that the last two in an avenue of trees are as distant from each other as the nearest, yet the distance appears to decrease as they are more remote. A square tower from afar off appears round; and mighty trees, in the distance, seem no larger than small bushes at hand. All these and similar conceptions are necessary, and in accordance with the laws of optics.

Those who reproach the sense of sight with committing the errors I have refuted, call to their aid the experiment of Cheselden on a person born blind. As in Cheselden's own account of the experiment, there is no mention of double or reversed vision after the operation, Le Cat therefore said

that these persons were acquainted with the situation of objects by touch, and consequently could not easily be misled by their sight when it was acquired. I, however, ask why they were not acquainted with the size and shape of objects? and why, though feeling informed them that objects touched not the surface of their bodies, they still seemed to touch their eyes? This even happened in the case of the blind-born individual who underwent the second operation twelve months after the first; and who, consequently, was already acquainted by the one eye with external bodies, and with their size and shape; yet the testimony neither of his touch nor of his sound eye was sufficient to persuade his other eye that portraits were not elevated objects.

Diderot has very well answered this reproach made against sight. Pictures, says he, produced the same effect upon savages when they saw them for the first time. They took portraits for living persons; they spoke to them, and were much astonished at receiving no answer. We ought to consider, continues Diderot, that vision cannot be perfect before the organization is perfect. The humours of the eye must have become clear, the iris must be conveniently dilatable, the retina neither too little nor too highly sensible, and the whole eye-ball fit for exerting all the particulars necessary to distinct vision. He also said, very well, sight is not necessary in order to be sure by touch that any substance exists; why should touch be necessary to sight in order to be sure by sight that the same thing exists?

The immediate function of sight is confined to the perception of light. All its other offices are mediate. The eyes may assist all the external senses, all the affective powers, and all the intellectual faculties. The connexion of the optic nerve with the brain also shows that sight chiefly assists its posterior, lateral, and anterior parts.

Thus the spheres of immediate activity of the five senses are very limited: feeling perceives only dryness, moisture, and

temperature; taste savours; smell odours; the ears sound; and the eyes light: all their other functions therefore are only mediate, that is, internal faculties, by means of the external senses, perceive various impressions, conceive peculiar ideas, recognize the existence of bodies and their qualities, and again act upon the external world by means of het senses and voluntary motion.

Recapitulation.

In this chapter I first examined the importance of the external senses. I next entered into some considerations applicable to every sense: as that each has two organs; that their impressions are double, but consciousness single; that each performs its functions by its own energy and independently; that each may be exercised; that the functions of all are modified; that they cannot produce their enjoyments, and that each has only one kind of perception. Further, I enquired into the mediate functions, or those offices of each sense not attributable to them alone, but depending on the existence of internal faculties. Finally, I ascertained the sphere of activity of each sense.

CHAPTER II.

Perceptive Faculties.

By this name I distinguish certain faculties necessary to acquire those notions of the external world which the five senses cannot produce. I shall in the first place make some general remarks upon the forehead, or front region of the brain, in which their organs are placed.

In comparing one kind of animal with another, and with man, we find that the forehead is developed in proportion as the intellectual functions appear. Animals are still commonly

said to act by instinct; there is no doubt, however, that many of them know the objects which surround them, remember events which have happened, and modify their actions according to these. An old fox having escaped many snares, and knowing that he is watched, is more cautious, and far slyer than a young one, in his approaches to the poultry-yard. A bird, which has had its nest once destroyed, conceives the necessity of secreting its second more carefully, even of constructing it with greater nicety than the first. A dog resists its instinct to pursue a hare, because it recollects the lashing received on a former occasion for having followed its inclination. Similar facts might be infinitely multiplied. Those cited prove that animals are not subjected to an absolute necessity in their actions, but that they are in a certain degree intellectual and susceptible of education. Now the size of their foreheads coincides with the degree of their understanding. The brain in animals low down in the scale, instead of rising and forming a forehead, is even inclined downwards. By degrees it becomes horizontal, then elevated, and forms a forehead of greater or less capacity; finally, in man, it is the most largely developed, and expands into a forehead which, in some cases, even projects beyond the plane of the face. Physiologists have universally given much attention to the developement of the forehead. Lavater has composed a scale of foreheads, from the frog to the Apollo Belvidere, with a view to prove the relation between the front lobes of the brain and the intellectual operations.

It is a curious fact that domestic animals have the forehead more developed than wild ones, and that animals are tameable in proportion as their forehead is developed. The cause of the tameableness of animals has long been sought after; and it has been asked, whether they are tame by nature, or subdued and made subservient to man by means of his understanding; it was long believed, and many philosophers and physiologists still think, that the state of domesticity among animals is solely

the work of man. But this opinion is erroneous; otherwise why should we find it impossible to tame every species, though we be better acquainted with their manners now than were the men of two thousand years ago, and consequently better able to adapt external circumstances to effect this end? It is, indeed, possible to tame individual wild animals, a single chamois, one tiger, and so on, but never the whole race of chamois or tigers. The hunting tigers of Tippoo Saib which were brought to the tower of London after the fall of Seringapatam, seemed tame only to their Indian keeper, and to the persons they had been long accustomed to see; but they were with difficulty retained so, and ultimately became fierce and untractable. The young of undomesticated animals, kept in confinement, are always wild and fly into solitude; whilst certain animals are domestic against our wishes: mice every where infest the abodes of man; and dogs in Egypt, regarded as impure, and having no master, nevertheless haunt villages and towns, never stray far from human dwellings, and consequently are originally tame and domestic.

Dr. Gall speaks of a peculiar organ of educability and tameableness in animals; he shews a scale to prove them more tameable in proportion as their foreheads are higher. The fact in itself is true; but Dr. Gall's explanation seems to be a mistake. The forehead is certainly not occupied by a single organ. I think that all the intellectual faculties, as also the feeling of benevolence, contribute to render animals tameable. Dr. Gall himself, in speaking of the organ of benevolence, says that animals endowed with it are more docile and more serviceable than others. I consider all such general observations on, and comparisons of, the foreheads of different animals, as a striking manner of showing that the state of developement of the front region of the brain coincides with the degree of the understanding.

I consider the perceptive faculties in the following manner: Several make us acquainted with every individual object and

its physical qualities; others perceive the different relations of various objects. The first conception our understanding must have of external objects is their existence; to acquire such knowledge, the external senses are not of themselves sufficient, although without an impression on them this conception cannot be determinate. The organ of the faculty which procures knowledge of external objects must therefore be considered the first in respect to the order in which the intellectual faculties operate.

I. INTELLECTUAL FACULTIES WHICH PERCEIVE THE EXISTENCE OF EXTERNAL OBJECTS AND THEIR PHYSICAL QUALITIES.

XXII. *Organ of Individuality.*

I SPEAK, under the name individuality, of the faculty which recognises the existence of individual beings, and whose activity and presence are denoted by substantives in language. I acknowledge that objects are inseparable from their qualities, and that these constitute objects; but I think it possible to conceive an existence or entity without knowing its qualities, as God, the mind.

This faculty excessively active is, like all others, liable to be abused. It inclines to personify notions, and even phenomena and abstract ideas. It is, indeed, a higher stretch of understanding to separate the existence of beings from their phenomena. The agency of individuality is observed in every branch of science. In philosophy it has originated numerous and grave errors. It has personified motion, life, disease, attention, memory, judgment, imagination, the passions, &c. Inactivity of the faculty, on the other hand, disposes men to overlook or deny the existence of external objects.

The kind of knowledge procured by individuality is essential and fundamental. The cerebral part on which its manifestations depend is situated behind the root of the nose, and

its greater developement enlarges the forehead between the eye brows, producing that beautiful form of nose called Grecian.

XXIII. *Organ of Configuration.*

Some individuals have an eminent power of recollecting those persons they have once seen, while others possess such talent in a very slight degree. This difference is perceptible in very early life, and is very remarkable in many tribes of animals. Insects recognise individuals of their own kind and of their peculiar family. Honey-bees distinguish those of their hive from those of others. In a flock of sheep all lambs know their mothers; elephants and dogs have occasionally displayed very striking powers of recognising masters and keepers after having been separated from them for a long time.

Dr. Gall was desired at Vienna to examine the head of a little girl who had extreme facility in recollecting persons; he only found that her eyes were pushed laterally outwards, and that she had a certain squinting look. He now speaks of the organ whose large size is indicated by distance betwixt the eyes, as that of sense or memory of persons. I consider the faculty under discussion in the following manner. To me there seems to exist an essential and fundamental power which takes cognizance of configuration generally, and one of whose peculiar applications or offices is recollection of persons; for persons are only known by their forms. I separate the faculty which appreciates configuration from that of individuality, since we may admit the existence of a being without taking its figure into consideration. Individuality may be excited by every one of the external senses, by smell and hearing as well as by feeling and sight, while the two latter senses alone assist the faculty of configuration. It is this power which disposes us to give a figure to every being and conception of our minds; that

of an old man to God; to death that of a skeleton, and so on. The organ of configuration is situated in the internal angle of the orbit; if large it pushes the eye-ball towards the external angle a little outwards and downwards.—(*Pl.* X. *fig.* 2. xxiii.) It varies in size in whole nations. Many of the Chinese I have seen in London had it much developed. It is commonly large in the French, and bestows their skill in producing certain articles of industry. Combined with constructiveness, it invents the patterns of dress-makers and milliners. It leads poets to describe portraits and configurations, and induces those who make collections of pictures and engravings to prefer portraits if they have it in a high degree. It is essential to portrait-painters. Crystallography also depends on it; and to me it appears that conceptions of smoothness and roughness are acquired by its means.

XXIV. *Organ of Size.*

Notions of the dimensions or size of external objects seem to me peculiar. There is no relation between such conceptions and the senses of touch, or sight, or any internal faculty of the mind. The idea of dimension cannot be confounded with that of configuration, for bodies of similar forms may be of very different sizes, and *vice versâ*. Moreover, these two sorts of ideas are not acquired with like faciliity.

The power of size is important to geometricians, architects, carpenters, mechanicians, &c. It measures the size of the heavenly bodies, and of terrestrial objects. Its organ is placed at the internal corner of the superciliary arch on both sides of individuality.

XXV. *Organ of Weight.*

Treating on the sense of feeling, I mentioned that it could not excite ideas of consistency, density, softness, and hardness,

nor of weight, lightness and resistance. These depend on an internal operation of the mind, and require a peculiar organ. This is probably small, and situated behind the orbit in the neighbourhood of the organs of configuration and size.

XXVI. *Organ of Colouring.*

The qualities of bodies already examined are the most essential, and the knowledge of them is also more important to man and animals than of the quality of colour. In speaking of vision, I have shown that it is insufficient to bestow excellence in colouring upon the painter. The eyes, it is true, perceive the rays of light, and are affected agreeably or disagreeably by their different modifications or colours, but they do not conceive the relations of colours, their harmony or discord, and have no memory of tints. To prove this, we have only to compare in man and animals the faculty of perceiving light-vision with the faculty of conceiving colours. I am not certain that animals are destitute of the faculty which distinguishes colour, though they do not paint; for there is a great difference between producing, and being capable of perceiving. Animals have the senses of smell and taste, but cannot furnish them with enjoyments; and they may possibly perceive different colours, their harmony or discord, and yet be incapable of painting.

Certain persons are almost destitute of the power of perceiving colours. I know a family, all the individuals of which distinguish only black and white; Dr. Unzer, of Altona, could not perceive green and blue; and at Vienna I saw a boy who was obliged to give up his trade of a tailor because he could not distinguish different colours. I have observed similar instances at Paris, at Dublin, and at Edinburgh. Those who do not perceive colours have sometimes a very acute sight, and readily appreciate the other qualities of external bodies, as their size

and form. There is nothing more common than that a painter should be an admirable draughtsman and a vile colourist. Thus, as the faculty of perceiving and employing colour is not in proportion to the sense of sight, nor to the understanding in general, there must be some particular faculty which cognizes, recollects, and judges of the relations of colour. It is therefore necessary to painters, dyers, enamellers, and to all who are occupied with colours. It is this faculty that is charmed with the flower-garden and the enamelled meadow.

The faculty which takes cognizance of colours is more active in women than in men, generally speaking, and in certain nations more than in others. Those of the east seem to possess it in a high degree. It is, however, necessary to distinguish in this faculty, as in every other, great activity from perfect action or good taste. Moreover, it is to be remarked that this faculty perceives the harmony of colours, but does not understand how to adapt colouring to the subject of a picture. This depends on superior intellectual powers. In the first acceptation, many women are good colourists, and have attained eminence; but in the second, as in all other departments of the arts, they have been surpassed by men.

The organ of colouring is situated in the middle of the arch of the eye-brow. Its greater developement is proclaimed by a full and much arched eye-brow; this external sign, however, is less certain than when the arch is drawn outwards and upwards, so that its outer part is more elevated than the inner. (*Pl.* XI. *fig.* 1, xxvi.)

II. Intellectual Faculties which perceive the relations of External Objects.

XXVII. *Organ of Locality.*

Though Dr. Gall's eyesight was very good, yet he could not always discover or recognise the places where he had been

before. One of his fellow-students, called Scheidler, on the contrary, had a surprising facility in recollecting localities, and never forgot the exact place where he had, in his rambles, discovered a bird's nest, and this without making any mark to guide him. As Dr. Gall, at a later period, began to collect busts in plaster, he moulded his fellow-student Scheidler, remarkable for his excellent local memory, and distinguished above the eye-brows, on either side of the mesial line of the head, a protuberance strongly marked. He then made observations on every person endowed with a similar faculty. He one day met a woman in Vienna, who had the protuberances corresponding to those presented by Scheidler's forehead, so extremely developed, as almost to amount to a deformity. On speaking to her, he learned that she had the greatest propensity to travel; that she had left her parents at Munich solely to see foreign countries; that she never lived long in the same house, because she liked change of place; and that her greatest pleasure consisted in travelling.

The pictures and busts of great astronomers, navigators, and geographers, as of Newton, Cooke, Columbus, &c., present a great developement in the situation indicated. (*Pl.* XI. *fig.* 2, xxvii.) This is the faculty which prompted Columbus to seek a new continent, and which makes and stimulates every zealous traveller. Bloede of Dresden speaks of one Augustus of Schneeberg, who had at one time been a miner, and who with a kind of ridiculous eagerness which prevents him from staying longer than one or two days at the same place, runs every year over the greatest part of Saxony, Lusatia, and Silesia; he has a fixed station for every day, like migrating birds, and brings the various landlords who assist him compliments and salutations from all their friends; he then gives the details of his last journey with the greatest volubility, keeping his body fixed, and his eyes shut. Bloede assured us that this odd personage has really two large protuberances in the situation mentioned. At Torgau, in Saxony,

we saw a blind man in whom the same part was much developed, and who told us that he liked to hear geography and travels spoken of, and that he had often dreamed of foreign countries. In one word, the seat of the organ of locality has been proved in man by many thousand facts.

Animals must also be endowed with it, otherwise they could find neither their progeny nor their dwellings, after they had been obliged to leave them in quest of food. The faculty indeed is very active in certain animals, while others are almost destitute of it. This dissimilarity is not only perceptible in different kinds, but also in different individuals of the same kind. One dog loses himself almost immediately after going out; another finds its usual abode and master from an enormous distance. There was a dog transported in a carriage from Vienna to Petersburg, which six months afterwards returned to Vienna. Another, transported from Vienna to London, still found means to come back, by attaching himself to a traveller in the packet-boat, and going with him to Mentz, whence he set off by himself for Vienna. Another, carried from Lyons to Marseilles, and shipped to Naples, nevertheless came back to Lyons by land. Another found his former master in Suabia, after having left his new master in Hungary. These, and many other similar facts, prove that they are wrong who derive such a power from the sense of smell; for smell could aid none of the dogs whose history I have given. Besides, these creatures do not always return by the nearest way. Moreover, the sense of smell cannot lead back pigeons to their cotes from which they had been transported to the distance of twenty leagues and more, shut up in a bag. The falcon of Iceland, though long confined, the first time it is flown at a heron, often mounts vertically into the air, seems to distinguish its native regions, and takes the direction of the north. It is equally impossible to maintain that such a faculty is an attribute of the eyes, because there is no proportion between its

energy and the excellence of vision. It must therefore be the appanage of an internal organ.

This faculty of locality being innate, and active by internal excitement, explains a phenomenon observed among animals, many species of which, chiefly birds, as swallows, storks, starlings, quails, nightingales, and others, migrate at certain periods of the year. These creatures also return, not only to the same climate and to the same country, but to the same spot, to the same window, chimney, or tree. The migrations do not result from scarcity of food alone; for, though it is true that the faculties are excited by external wants, and that certain birds leave one country in quest of food in another, yet the faculties must exist before they can be stimulated. Besides, every faculty may be active without excitement from external want, and this is rendered evident by the circumstance that certain birds migrate before food is wanting, and come back before it is to be found. Moreover, if migratory birds be confined in a cage and fed abundantly, they become unquiet at the periods of their flight. Finally, why do not all birds leave their ordinary dwelling when food is scarce or wanting? These considerations show the necessity of admitting an internal and innate power as a cause of all the phenomena.

The special faculty of its organ and the sphere of its activity remain to be determined. It makes the traveller, geographer, and landscape-painter, recollects localities, and gives notions of perspective. It seems to me that it is the faculty of locality in general. As soon as we have conceived the existence of an object and its qualities, it must necessarily occupy a place, and this is the faculty that conceives the places occupied by the objects that surround us. It not only procures this kind of knowledge, but it is also fond of it; and as their cause explains all the phenomena of which I have spoken. Notions of localities and places are not the same as those of size or dimensions; these latter concern each individual object,

while the former implicate the various situations wherein individual objects are placed with relation to each other.

Space does not seem to me a mere *form of our understanding*, as Kant has maintained. It is true the conception of space cannot be attributed to any of the five senses, but space certainly does exist in the external world. The conception of causality or necessary consequence also cannot be attributed to the five external senses; but the relations and succession of phenomena called cause and effect exist in nature. The same truth applies to all the categories established by Kant, which relate to external objects; internal faculties constitute them, and they are adapted or in relation to the external world; in other words, all conceptions of external objects are results of internal faculties calculated by creation to apply to the external world.

XXVIII. *Organ of Calculation.*

Some individuals, remarkable for great arithmetical talent, attracted Dr. Gall's attention. Even children were found who excelled in this power. There was a child seven years old, called Devaux, who took extreme delight in running about the fairs of his native town, and making calculations for the merchants. A boy thirteen years of age, born at St. Poelten, not far from Vienna, surpassed all his school-fellows surprisingly at figures. He learnt with ease an immense quantity of numbers by heart, went through the most complicated arithmetical problems mentally, and very soon solved them. Mr. Mantelli, a counsellor of the Court of Appeals at Vienna, took a particular pleasure in solving questions in arithmetic: and his son of five years of age did little but calculate during the whole day. In individuals so inclined and endowed, the external angle of the eye-brow is either much pressed downwards, or elevated. (*Pl.* XII. *fig.* 1, xxviii.) This configuration results from a greater developement of the cerebral part situated behind the outer angle of the orbit. The por-

traits and busts of great calculators, as of Newton, Euler, Kaestner, Jedidiah Buxton, Hutton, &c., present this external sign.

Certain races of negroes make five the extent of their enumeration, that is, they count only as far as five by simple terms; all their numbers after five are compound; whereas ours are not so till we have passed the number ten: while our terms, six, seven, &c., are simple, they say, five-one, five-two, five-three, &c. Negroes in general do not excel in arithmetic and numbers. Accordingly their heads are very narrow in the seat of the organ of number. Individuals among them, however, have considerable powers of computation, and the organ larger and more energetic than many Europeans.

I am not certain whether this faculty exists in animals. Bitches are said to perceive if one of their puppies be taken away; but this does not prove that they count their young ones: they may perceive by the faculties of individuality and configuration that there is one wanting. George Le Roi has observed that magpies count three; for if there be a hut in the neighbourhood of a tree upon which a magpie has built its nest, and if three persons enter it, the magpie will not visit its nest before the three have gone away; if, however, more than three enter, it can no longer keep count, or compare the number of those who went in with those who come out. Dupont de Nemours thought that magpies could count nine.

Whatever concerns unity and plurality—number, belongs to this faculty. Hence its end is calculation in general. Dr. Gall commonly calls the organ of the power under consideration the organ of mathematics, but I think it only calculates; and whilst arithmetic, algebra, and logarithms belong to it, the other branches of the mathematics and geometry are not products of its activity alone. It may be applied not only to size, but also to form, colour, and melody.

XXIX. *Organ of Order.*

The idea of order supposes plurality, but this may exist without order. The mind, acquainted with external objects, their physical qualities, the places they occupy, and their number, may still consider the order in which they are ranged with regard to each other. There are individuals, even children, who like to see every piece of furniture, at table every dish, and in their business every article, in its place, and who are displeased and unhappy when things are in disorder around them. The Sauvage de l'Aveyron, at Paris, though almost a perfect idiot, could not bear to see a chair or any other article out of its place. As soon as any thing was disarranged, he went, of his own accord, and put it right. This disposition to arrange, however, differs from that philosophical method which results from consistency of ideas. The faculty of which I speak in this place gives method and order to objects only as they are physically related: but philosophic or logical differences, conceptions of system or generalisation, and ideas of classification, are formed by the reflecting faculties. The faculty here discussed is merely fond of putting particulars in order according to physical considerations; as in a library, books according to their size and form; and in natural history, animals according to their configurations. In general, order may be applied to form, size, colour, things, words, &c. Its organ is situated between those of colouring and calculation. Cleanliness or tidiness appears to depend on it. It seems also that it produces the pleasure of seeing things complete. Order is impossible while the subject of arrangement, as a collection, is imperfect.

XXX. *Organ of Eventuality.*

Dr. Gall admits, both in man and animals, a peculiar organ of educability, or of the memory of things and of events. Individuals are met with every day who have a general knowledge of

the arts and sciences, and who, without being profound, know enough to be capable of speaking on them with facility; individuals who are deemed brilliant or clever in society. The middle part of their foreheads Dr. Gall found was very regularly prominent. (*Pl.* X. *fig.* 1, xxx.) At first he called the cerebral part in the above situation the organ of the memory of things, because those largely endowed with it were commonly well-informed, and knew a great deal; he afterwards named it the sense of things. In comparing animals with men, and one kind of animal with another, he found that tame have fuller foreheads than wild animals, and that animals are generally tameable as the forehead is more largely developed; he therefore now calls it the organ of educability. But I conceive that Dr. Gall in this attributes to a single faculty manifestations which depend on intellect generally. The title educability is evidently bad, seeing that every faculty may be educated, in other words, exercised and directed. Moreover, animals and men vary their actions according to motives given by the whole of the faculties whose organs lie in the forehead, and also according to various feelings.

The peculiar cerebral part which I have already indicated is largely developed in children. It varies in size among adults, is larger in boys than in girls, and differs in magnitude among entire nations. Individuals who have it large are attentive to all that happens around them, to phenomena or events, to facts; they are fond of history, of anecdotes; are inquisitive, and desire information on every branch of natural knowledge.

Moreover, it seems to me that this faculty recognises the activity of every other, whether external or internal, and acts in its turn upon all of them. It desires to know every thing by experience, and consequently excites all the other organs to activity; it would hear, see, smell, taste, and touch; is fond of general instruction, and inclines to the pursuit of practical knowledge. It is essential to editors, secretaries, historians,

and teachers. By knowing the functions of the other powers, this faculty contributes essentially to the unity of consciousness. It seems to perceive the impressions which are the immediate functions of the external senses, and to change these into notions or ideas. Moreover, it appears to be essential to attention in general, and to the recognition of the entity *myself* in philosophy. Its sphere of activity is very great, and every philosophic system has taken account of some of its operations.

XXXI. *Organ of Time.*

Conceptions of time are evidently peculiar in their nature; they may exist even without order and number. Yesterday, to-day, to-morrow, the day after to-morrow, &c., form a succession, having no regard to the number of days. There is more connexion between time and order, and also more between order and number, than between time and number.

Order relates more peculiarly to objects, time to facts or events. The conception of time is of higher character than order or number. Accordingly the organ of time occupies a higher place in the brain than that of order, which is in a middling situation, or of number, which is the lowest and most external of the three. The natural language of time and of number proves indeed that the organs of these faculties occupy different places; in thinking of time, the eyes are turned upwards, and in calculating they are cast downwards and outwards.

The faculty of time conceives the duration of phenomena, their simultaneousness, or succession. Its organ is situated between eventuality, locality, order, melody and causality.

XXXII. *Organ of Melody.*

The organ of melody bears to the ears the same relation as that of colour does to the eyes. The ear hears sounds, and is agreeably or disagreeably affected by them; but it has no recol lection of tones, and does not judge of their relations. It does not perceive harmonious combinations of sound, but separate tones only; and sounds as well as colours may be separately pleasing though disagreeable in combination. In treating of the sense of hearing I have already demonstrated that music has not originated from its existence. Besides the proofs there adduced that the ear is not the instrument of musical perception, there exists direct evidence of an internal organ being necessary to this; for sometimes in epileptic fits and in delirium, individuals sing with great precision, and then this organ is active, while the functions of all the others are suspended or deranged. A greater developement of the organ on which musical perception depends enlarges the lateral parts of the forehead,—(*Pl.* XII. *fig.* 2. xxxii.)—but its form varies according to the direction and form of the convolutions composing it. In Gluck, Haydn, and others, it had a pyramidal form; in Mozart, Viotti, Zumsteg, Dussek, Crescenti, and others, the external corners of the forehead were only enlarged and rounded.

The heads of birds which sing, of those which do not, and of the individuals of the same kind which have a greater or less disposition to music, differ conspicuously at the place of this organ. The heads of male singing birds are easily distinguished from those of females of the same kind by the different developement of the organ of melody in each. Observations on this organ are so numerous that it is considered as quite established.

There is a striking analogy between colours and tones and their respective organs; colours being perceived by the eyes, and sounds by the ears; there being primitive colours and pri-

mitive tones; there being an agreeable succession of colours as there is of tones, that is, there being colours and tones which agree with one another, and others which do not; colours must harmonize, and tones must be concordant; lastly, the concordance both of colours and of tones may be considered by the faculties of order and number. In this manner, indeed, colours and tones are calculated, and the principles of painting and music established.

XXXIII. *Organ of Arbitrary Language.*

Dr. Gall, in his youth, noticed that several of his school-fellows learned even things which they did not understand with great facility by heart, whilst he with the utmost difficulty engraved in his memory a very small number of words; and he observed that all the boys who excelled in verbal memory had prominent eyes.

He afterwards spoke of an organ of words, the great degree of whose developement is denoted by prominent eyes. Sometimes the eyes not only project, but are also depressed, and then the under eye-lid presents a sort of roll, or appears swollen.—(*Pl.* XIII. *fig.* 2. xxxiii.) Those who have such a physiognomisign are fond of philology; they like to study the spirit of languages. Dr. Gall speaks of the two configurations as the signs of two different organs, under the titles, organ of words, and organ of languages.

It is quite true that some easily learn the spirit of different languages without having a great memory for words, and that others readily acquire its words without catching the spirit of a language; yet it seems to me that the spirit of words and philology in general depend on the same special faculty. In the philosophical part of Phrenology, I show that judgment and memory are not different degrees of activity of any faculty, but general modes of activity of several; and that each may exist independent of the other. It seems also to me that the organ of words must have its laws as well as those of

colour, of melody, or any other faculty; now the law of words constitutes the spirit of language. I am satisfied that this opinion is correct, because the spirit of every language is the same, just as the essence of all kinds of music is alike; that is, the laws or principles of music and of language rule universally, and are constant: they are only modified in different nations by modifications in their organs, and dissimilar combinations of these in each. I, therefore, admit only one organ of language.

Before the special faculty of this organ can be understood, we must examine the question so often treated by different authors: what is the influence of signs upon ideas? According to many philosophers and to common opinion, signs may produce ideas. Accuracy of language is said to be necessary to accuracy of thought. This, however, is to christen the child before it is born. I think, with St. Martin, that it is more reasonable to put the question in the opposite way: what is the influence of ideas upon signs? though the Institute of France gave its prize to him who developed the influence of signs upon ideas.—In speaking of the influence of signs upon ideas, or the contrary, the question ought to be more distinctly stated, and it should be asked, whether artificial signs can *produce* ideas? Now, I am convinced that no arbitrary sign can *produce* any idea; I am satisfied that ideas precede, and that arbitrary signs follow; that without ideas there would be no arbitrary sign; and that, without having first had the idea, its arbitrary sign is without meaning. We have an evident proof of this in persons blind from birth. The words red, green, blue, white, give them no conception of colour.

Here I must explain what is meant by an *idea*. Some philosophers, after the etymology of the word, call every sensation which presents an image, idea. In this sense, however, there are very few ideas; even the sensations of the external senses would not all deserve the name; for savours, odours, tones, and colours, do not present any image. Other philosophers style sensations produced by means of the external

senses, ideas. Others again understand by the expression, every sensation produced by activity both of the external and internal senses. Moreover, ideas are spoken of as of two kinds, simple and compound; the first being acquired by the external senses, the second being the result of reflection—abstract and general ideas. I propose to confine the term *idea* to the conceptions of the perceptive faculties, and to call the functions of the reflective faculties *reflection*. The organic apparatus of all the internal faculties may be active, and a being may consequently have an inclination, a sentiment, an idea, or reflection, without manifesting it by any sign whatever. Man and animals however are destined for society; it is consequently necessary that they should communicate and understand their sensations, ideas, and reflections, and this communication can take place only by means of signs.

These signs are either natural, or arbitrary and artificial. Natural signs conform universally to every faculty. Every being endowed with a given faculty manifests its activity essentially in the same manner, and understands its natural manifestations in others; whilst beings endowed with different faculties can neither communicate their own sensations so as to be understood, nor understand those expressed by others. This law is common to man and animals. Animals which have certain faculties in common with man, understand their natural manifestations in the human kind. The dog, for instance, understands signs of anger in his master perfectly, because possessed of the faculty which produces anger; but he will never understand the natural signs of adoration. From this it must be evident that individuals of the same kind understand the natural signs of peculiar faculties better, if the faculties which speak in others are of equal strength in themselves. The natural language is also known under the name of pathognomy, and deserves to be treated of separately.

The second sort of signs are arbitrary and artificial. Natural language, I have said, is common to animals and man; artificial

language is a prerogative of the human kind, and is a result of certain superior intellectual faculties, which contrive means of gratifying all the others. To communicate his sensations and ideas, man generally uses the artificial rather than the natural language, though this last regularly and involuntarily accompanies the first. As natural language is principally expressed by the voice and various motions, so the same means are the readiest and most natural for producing artificial signs; but if the voice do not serve, as in addressing the deaf or persons at a distance, we then recur to gestures and to written signs. How absolutely artificial vocal signs are without meaning in themselves, is evident from untutored man's universal ignorance of any other than his mother tongue. If, moreover, we would communicate certain sensations or ideas to an individual only, we must choose arbitrary and secret signs—signs which he alone understands. Hence it is certain that artificial signs do not by themselves produce any idea.

The superior intellectual faculties form the conception of producing artificial signs for mental acts generally; and therefore sensations, ideas, and reflections must exist, before there can be arbitrary signs invented to indicate them. It follows, moreover, that signs must be multiplied and modified according to the sensations and conceptions of the mind; hence there are as many sorts of signs as faculties. There are words or signs to indicate individual objects,—nouns. Others to denote the qualities of substantives,—adjectives, which in certain languages agree with the substantives, and which are also susceptible of different degrees. As there are different sexes among living beings, the signs admit of genders. The number of objects is also considered; sometimes number alone, sometimes number combined with order, and sometimes with order and time; one, two, three, &c.; or first, second, third, &c.; or first time, second time, third time, &c. There are other words again which may be used instead of substantives,—pronouns; and these are either personal, possessive, demonstra-

tive, or relative. Other signs,—verbs, denote the state of the subject spoken of, whether a person or thing, and this state may be active, passive, or neuter; it may be affirmed or denied by certain terms in a positive (indicative), conditional (conjunctive or subjunctive), or imperative manner; it may moreover be considered in relation to time, whether present, past, or future. Other signs explain the verbs,—adverbs, many of which being analogous to those indicative qualities of substantives, denote places, times, numbers, quantities, &c. There are also particles which indicate different operations of the mind: some causes, some connexion or conjunction; others, condition; and others again, time, order, sudden mental emotions,—(interjections). There are artificial signs, then, for every operation of the mind, and if all signs may be reduced, etymologically considered, to nouns and verbs, their significations are still different and their terminations are therefore changed.

Now there is a particular faculty whose office it is to learn signs, which are, as we have seen, produced in conformity with the activity of all others, by superior intellectual faculties. It differs from those which produce artificial signs, and also from those which produce the sensations and ideas these are assumed to express. There is, indeed, no proportion between these different kinds of faculties. Among mankind some excel in one of them and not in the other. It is very possible to have many ideas without great powers of learning the arbitrary signs which express them; and also to know many words without having many ideas. By this faculty of arbitrary language then, we perceive the connexion of audible and visible signs with things signified.

To converse, however, by means of audible signs, besides the inclinations, sentiments, ideas, or reflections, and the words or vocal signs invented to express them, we must possess the organs of voice and the sense of hearing. I have already said, that arbitrary language is more necessary to the mani-

festations of the intellectual faculties than of the propensities and sentiments. The organ of language accordingly occupies a transverse situation in the midst of the perceptive faculties.

This, like all other organs, seems composed of different parts. Some persons are apt to forget proper names, while they recollect words denoting qualities of external bodies. Disease or accident has entailed this peculiarity in several instances. One Lereard, of Marseilles, having received a blow from a foil on the eye-brow, lost the memory of proper names entirely: he sometimes forgot the names of his intimate friends, and even of his father, as he stated in a letter written to Dr. Gall, for advice. Cuvier, in his historical eulogium on Broussonnet, delivered in the Institute of France, in 1808, relates that this famous botanist, after an apoplectic fit, could never recollect either proper names or substantives, though he recovered his prodigious memory of other matters. He knew the forms, leaves, and colour of plants, and recollected their epithets, but could not recal their names.

Dr. Gall thinks that in consequence of being destitute of this faculty, monkeys, ourang-outangs, and other animals, want the power of speech. It seems to me, however, that animals have it in some degree; for they learn to repeat arbitrary signs and understand them as far as they have the sensations expressed; and I am of opinion that animals want speech for the same reason that they have no clothes, make no fire, and do not produce food. It is certain that deficiency in vocal organs is not the cause of animals having no artificial language; for some of them pronounce words, even sentences, nay and understand what they say, but yet produce no artificial sign whatever.

Half-idiot children there are who never speak, though they do many things like reasonable persons; and then parents, relations, and even physicians, cannot conceive their partial imbecility. Now though such children be not deaf, though they pronounce various words, yet they never go on to speak, and the cause of this is often looked for in the organs con-

nected with the production of voice, the tongue, amygdaloid glands, palate, &c.; but the state of these parts is never the reason of the want of language. The organs of voice, it is true, produce sounds, but they do not originate or cause vocal language: persons deprived of several, as of the tongue, the palate, have yet continued to speak.* Their pronunciation, of course, was not so distinct as that of other persons, but they felt the necessity of communicating their sensations and ideas, and therefore contrived to speak. On the contrary, these half-idiots pronounce single words very well, but cannot keep up a conversation, nor fix their attention, nor combine their expressions. They are consequently destitute of the power of learning, as well as of the intellectual faculty of inventing arbitrary signs.

There are two occasional causes of such partial imbecility,—slight hydrocephalus, distending the brain and pushing the eyes forward precisely as a very considerable developement of the cerebral parts behind the orbits does. These children may therefore present the external mark which in a healthy state of the brain denotes great strength of the faculty of arbitrary language. This circumstance, however, does not prove the impossibility of discovering the state of the organ on which it depends, as certain adversaries of Phrenology have maintained: it presents only a difficulty which must be removed. The state of the organization generally must guide our judgment. The second cause of this partial imbecility is some real defect of organization: the cerebral part, whose function is arbitrary language, may be either wanting or very slightly developed, and then individuals so constituted never speak. Their eyes, instead of projecting, lie deeply sunk in the orbits, the roofs of which, instead of being plane, are quite concave.†

* Bartholin speaks of this in a boy who lost his tongue by suppuration from small-pox:—Huxham saw the same in a girl:—Schenk, Tulpius Richter, &c., speak of similar facts. There is also a dissertation by Aurran, De Fœminæ Elinguis Loquela. Argentor. 1766.

† What is to be done with such children? Those affected in the first

I therefore admit only one organ of language, which produces similar phenomena in regard to language or arbitrary signs, as the other intellectual faculties do in regard to external impressions. It makes us acquainted with arbitrary signs, remembers them, judges of their relations, and gives a disposition to indulge in all exercises connected with words.

CHAPTER III.

Reflective Faculties.

XXXIV. *Organ of Comparison.*

Dr. Gall observed that there were individuals who, to convince others in an argument, had regularly recourse to examples, similitudes, and analogies, and seldom to causation. In the middle of the superior parts of their foreheads he constantly found an elevation, in shape like a reversed pyramid. From its functions, he named the cerebral part beneath, organ of analogy, (*Pl.* xiv. *fig.* 1. xxxiv.) This organ is developed in all popular preachers, who very regularly speak by examples and parables, and choose their similitudes from facts generally known. Dr. Gall possesses the skulls of two Jesuits who had this faculty and its organ in a high degree. Indeed, to succeed in persuading and affecting an audience,

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way ought to be sedulously strengthened by a good physical education, and by avoiding too incessant exercise of their feelings and intellectual faculties. The fibres of the brain with age occasionally become stronger, and resist the pressure of the water accumulated in its cavities. Too early instruction is under all circumstances hurtful, but it is especially so to these children. The disease springing from the second cause, or deficiency of organization, is of course irremediable.

the orator must almost necessarily speak by analogy; he must bring spiritual things near to terrestrial objects, by comparing them with each other, and imitate the manner of the preaching of Christ, who very frequently spoke in parables.

The activity of the faculty of comparison is very important. It compares the sensations and ideas excited by all the other faculties; and points out their difference, analogy, similitude, or identity. It compares, for instance, the functions of the external senses with those of the internal faculties; and hence it often happens, that the same vocal signs or expressions are applied to both kinds of functions, and then they are sometimes positive, sometimes figurative. The language of every nation proves whether this organ is much or little developed in the majority of those composing it. If it be generally large, their language is replete with figurative expressions.

The faculty of comparison attaches us to comparison without determining its kind; for every one chooses his analogies from his knowledge, or from within the sphere of activity of his other faculties. One who has the faculty of locality in a high degree, derives thence his examples: another gathers them from figure, or from any other faculty with which he is eminently endowed.

XXXV. *Organ of Causality.*

Dr. Gall remarked that those who were attached to the study of metaphysics, presented such an hemispherical developement of the superior part of the forehead, as is seen in Mendelsohn, Kant, (*Pl.* XIV. *fig.* 2, xxxv.) Fichte, and others.

It is very remarkable that the ancient artists should always have given their busts of philosophers a large forehead, and represented Jupiter Capitolinus with a forehead more prominent than is ever seen in nature; they would seem to have observed that developement of the forehead has a relation to great understanding.

Dr. Gall ascribes to the hemispherical configuration of brow

mentioned above the love of metaphysics, or profound reasoning. To this, I must, however, object, first, that in the configuration dessribed, both the middle and lateral parts of the front cerebral lobes are involved; and that the special faculty of both is not the same. It happens indeed that sometimes the middle, sometimes the lateral parts are most developed. Moreover, the name metaphysics does not designate the power of the mind. And I therefore ask, what is the special faculty of the lateral parts? Let us examine the most active faculty in metaphysicians. Their object is to investigate the nature of all things, even the nature of God, and of the immortal soul. Though, with Kant and others, I think that it is impossible by reasoning to penetrate these subjects, it may still be asked, what faculty endeavours to do so? Metaphysicians, in their attempts to explain phenomena, necessarily examine the relations between cause and effect. Philosophers in their explanations of natural phenomena by reasoning, always suppose or admit some cause, and then develope their subject by mental induction according to it. Is seems to me, therefore, that the special faculty of the cerebral parts on either side of comparison, examines causes, considers the relations between cause and effect, and prompts men to ask Why?

Thus, the faculty of individuality makes us acquainted with objects, that of eventuality with facts; comparison points out their identity, analogy, or difference; and the faculty we are now considering, and which I style causality, desires to know the causes of all occurrences. Consequently, these faculties together, drawing conclusions, inductions, or corollaries, point out principles and laws, and constitute the truly philosophic understanding. The faculty of eventuality must furnish a sufficient number of facts in order to permit the two superior faculties to draw consequences and establish general principles. The effects of causality are immense: the cultivation of fields, plantation of trees, all the artificial enjoyments of the external and internal senses, the invention of instruments of all kinds,

in short all which man produces by art, depends on this faculty.

It knows the conditions under which events happen, brings these to bear, and produces effects; for man cannot create, he can only imitate nature; he cannot attain final causes, which nevertheless must exist; all he can know is the succession of phenomena, and if one uniformly succeed another, the preceding is considered as the cause and the succeeding as the effect.

General Reflections and Conclusion.

I now bring this volume to a close, hoping to have accomplished the aim I had in view: the determination of the physiology of the brain, the specification of the primitive faculties of the mind, and the discovery of their respective organs. The fundamental powers of the mind, as demonstrated in Phrenology, are evidently very different from those admitted in any of the systems of philosophy hitherto promulgated. The discussion of the relations between Phrenology and the schools of philosophy I have reserved for a separate volume. The special organs of the mental functions, except those of feeling and of voluntary motion, are all contained in the head. Those of the faculties most commonly possessed by animals are at the basis of the brain, and the others, as their functions rank higher, occupy superior situations; those, consequently, of the powers peculiar to man compose the entire upper and fore parts of the cerebral mass. The organs of the faculties, too, which have something analogous in their nature, as of the propensities, of the sentiments, of the perceptive, and of the reflective powers, are regularly found together; and those of the faculties which more especially aid each other are also in each other's vicinity. We can, therefore, speak of the organs under rubrics: amativeness, philoprogenitiveness, adhesiveness, and inhabitiveness, are all in one neighbourhood; combativeness is surrounded by amativeness, philoprogenitiveness, adhesiveness, and destructiveness; secretiveness is between destructiveness, acquisitiveness, and cautiousness; self-esteem and firmness go together; so do adhesiveness and love of approbation; so also benevolence, veneration, hope, and marvellousness; individuality and the powers which perceive the physical qualities of external objects

are vicinate; eventuality, comparison, and causality, run into each other, and so of the rest. Organs are, further, placed nearer the mesial line of the head, as their functions are more important. Finally, the organs of the affective powers comprise by far the greatest mass of the brain; those of the intellectual powers, though very numerous, are extremely small. The whole of the organs common to man and animals are generally larger than those which are proper to man.

The primitive powers of the mind and their respective organs, having been proved by observation and induction, cannot be attacked by reasoning alone; supported by invariable facts, they must be admitted as existing by the will of the Great and Supreme Cause of the universe. "*Thy will be done on earth as it is in heaven,*" is the great and leading commandment; Phrenology enforces it upon new grounds, and may be shewn to furnish the most effectual means of rendering man better and happier than he is. This, indeed, must be the ultimate result of Phrenology.

Explanation *of the Figures representing various Portraits, and of the Numbers referring to the various Organs marked in the Plates.*

Pl. I. fig. 1. Hydrocephalus: idiotic child. Fig. 2, Hydrocephalus: adult and intelligent.

Pl. II. fig. 1, Idiot, 25 years old. Fig. 2, Lord Bacon.

Pl. III. fig. 1, J. M * * *, historian, has I. large. Fig. 2. A French abbé, full of vanity but feeble in amativeness; I. is small.

Pl. IV. Two female heads. Fig. 1 has the organ of philoprogenitiveness large. Fig. 2 has it small.

Pl. V. Two views of heads from behind. Fig. 1 has v. vi. and x. large, xii. and xv. small. Fig. 2, on the contrary, has v. vi. and x. small, and xii. and xv. strongly marked.

Pl. VI. fig. 1, has vii. and xiii. large; v. vi. xii. and xv. small. Fig. 2 has v. vi. xii. and xv. large, but vii. and xiii. small.

Pl. VII. fig. 1 and 2, Heads of bull-dogs. Fig. 3 and 4, Heads of horses. In fig. 1 and 3, v. and xiii. are large; the same organs in fig. 2 and 4 are small.

Pl. VIII. fig. 1, with a large developement of xiii. and xiv., whilst v. and vi. are very small. Fig. 2 has v. vi. viii. and xv. large, and the anterior and upper part of the head small.

Pl. IX. fig. 1. Sterne: xx. is very considerable. Fig. 2, Shakspeare, has xix. and xxi. much developed.

Pl. X. fig. 1, has the middle part of the forehead, marked xxx. very prominent; in fig. 2, ix. xxii. and xxiii. are very strong.

Pl. XI. fig. 1, P. P. Rubens; xxvi. very large. Fig. 2, Captain Cook: xxvii. much developed.

Pl. XII. fig. 1, Jedidiah Buxton: xxviii. very large. Fig. 2, Handel: xxxii. very strongly indicated.

Pl. XIII. fig. 1, has eventuality and language strong. Fig. 2, Horne Tooke: language particularly indicated.

Pl. XIV. fig. 1, J. Abernethy, D. D., with large comparison. Fig. 2, Kant: the upper part of the forehead is very prominent.

NAMES OF THE ORGANS.*

No. I.	Organ of	Amativeness.
II.	,,	Philoprogenitiveness.
III.	,,	Inhabitiveness.
IV.	,,	Adhesiveness.
V.	,,	Combativeness.
VI.	,,	Destructiveness.
VII.	,,	Secretiveness.
VIII.	,,	Acquisitiveness.
IX.	,,	Constructiveness.
X.	,,	Self-esteem.
XI.	,,	Love of Approbation.
XII.	,,	Cautiousness.
XIII.	,,	Benevolence.
XIV.	,,	Veneration.
XV.	,,	Firmness.
XVI.	,,	Conscientiousness.
XVII.	,,	Hope.
XVIII.	,,	Marvellousness.
XIX.	,,	Ideality.
XX.	,,	Mirthfulness or Gayness.
XXI.	,,	Imitation.
XXII.	,,	Individuality.
XXIII.	,,	Configuration.

* The numeration of the organs being in this edition different from that in the former editions, does by no means indicate that the situations of the individual organs have been altered. The place of firmness, for instance, formerly numbered xxviii., and now marked xv., is always the same, and so it is with several other organs. Their numbers are changed merely because I now treat of the organs in another order.

XXIV.	Organ of	Size.
XXV.	,,	Weight and Resistance.
XXVI.	,,	Colouring.
XXVII.	,,	Locality.
XXVIII.	,,	Calculation.
XXIX.	,,	Order.
XXX.	,,	Eventuality.
XXXI.	,,	Time.
XXXII.	,,	Melody.
XXXIII.	,,	Language.
XXXIV.	,,	Comparison.
XXXV.	,,	Causality.

THE END.

London : S. Bagster, Jun., Printer, 14, Bartholomew Close.

Pl. 1

Fig. 1.

Fig. 2.

Fig: 1

Fig. 2.

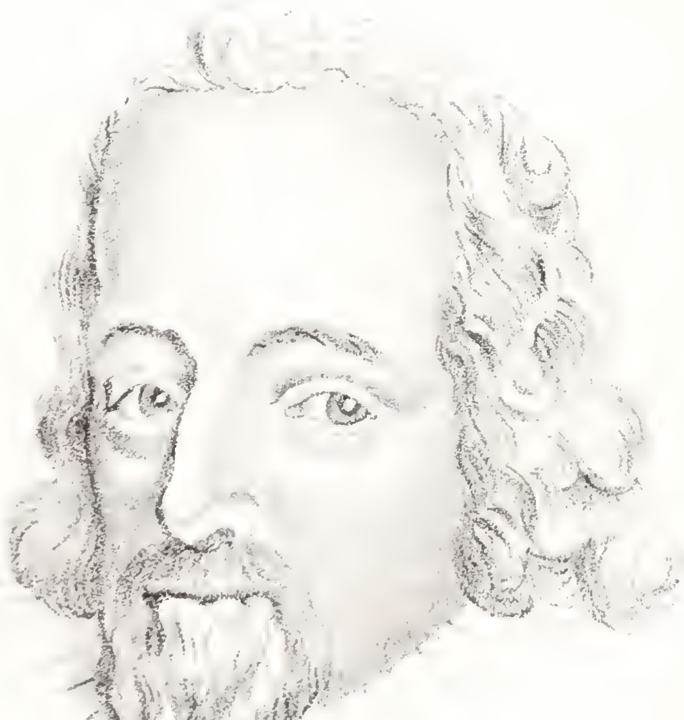

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Fig 1.

Fig 2.

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Fig. 1.

Fig. 2.

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Fig. 1

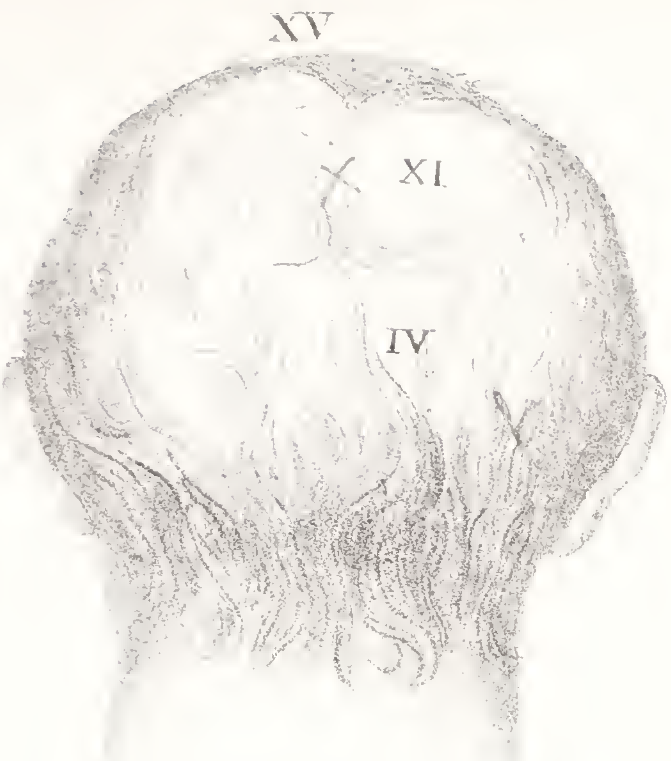

Fig. 2

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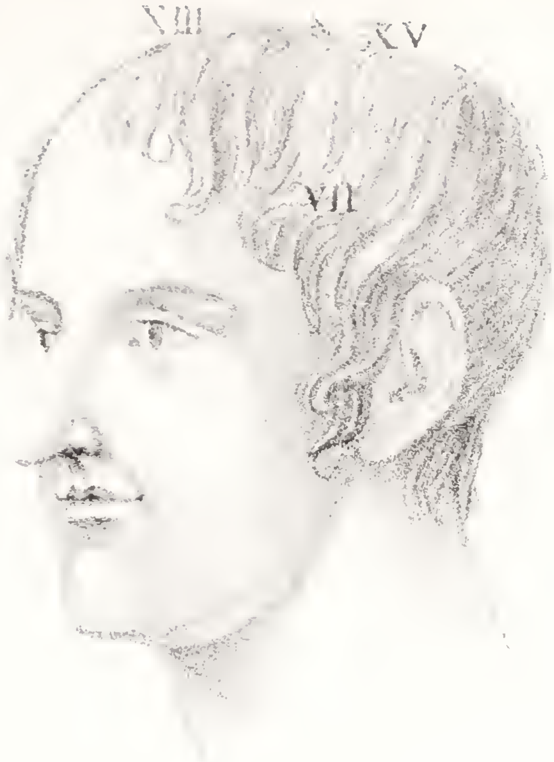

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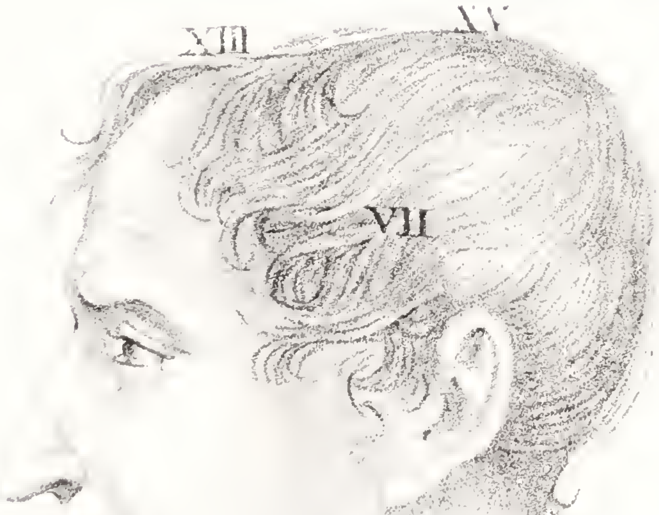

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Pl. VII

Fig. 1

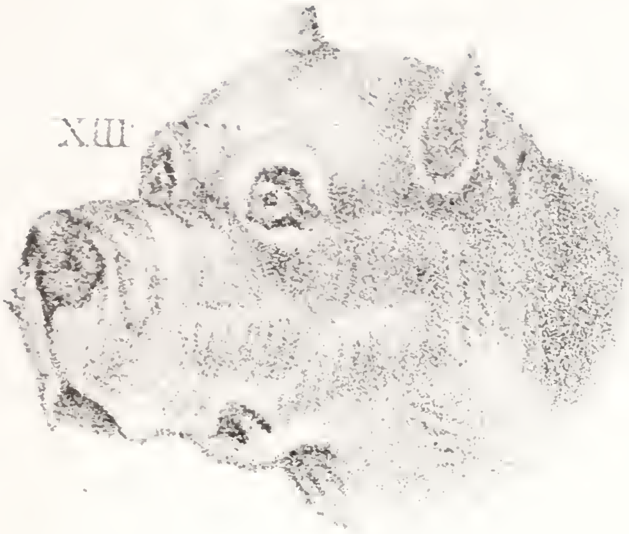

Fig. 2

Fig. 3

Fig. 4

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Fig 1.

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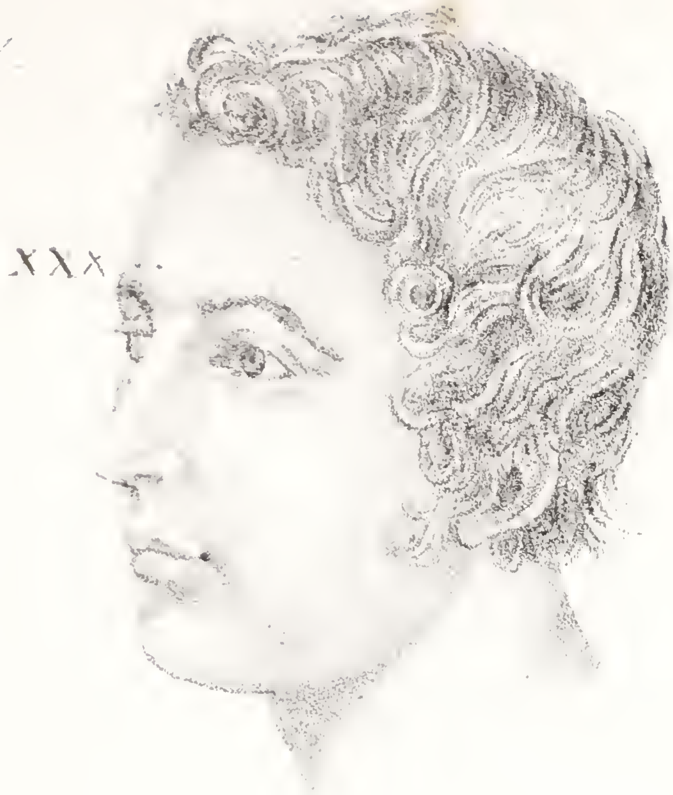
Fig. 1.



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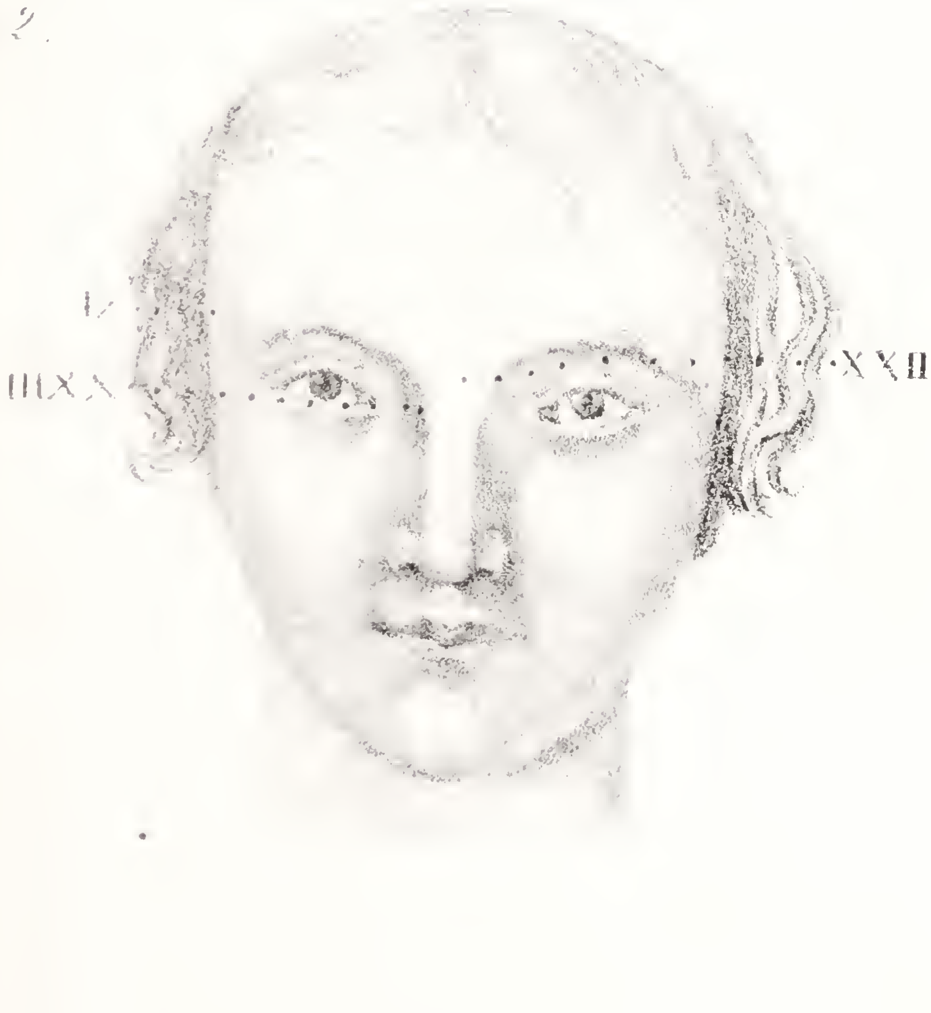
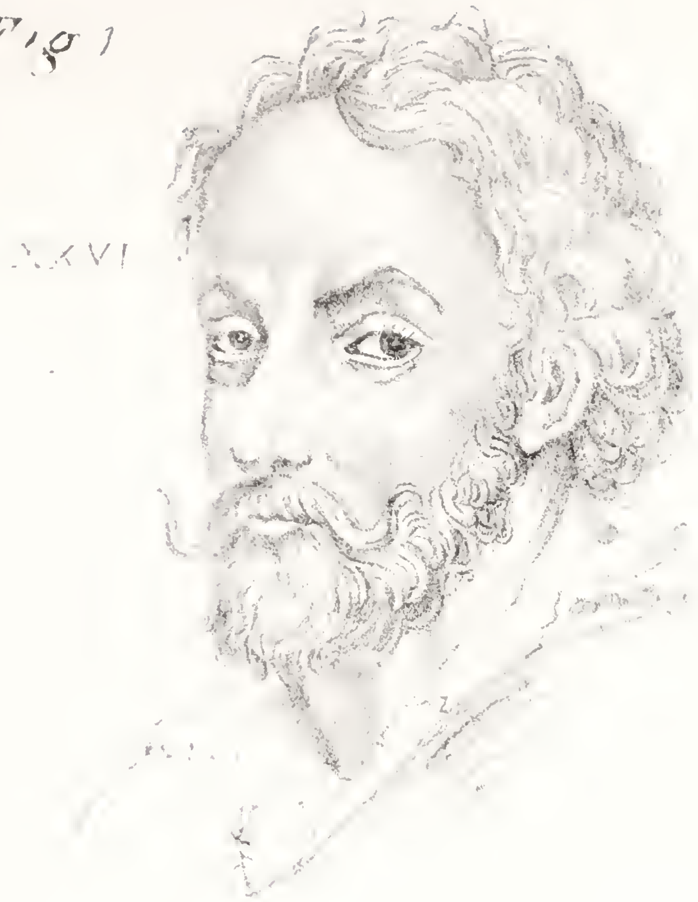


Fig 1



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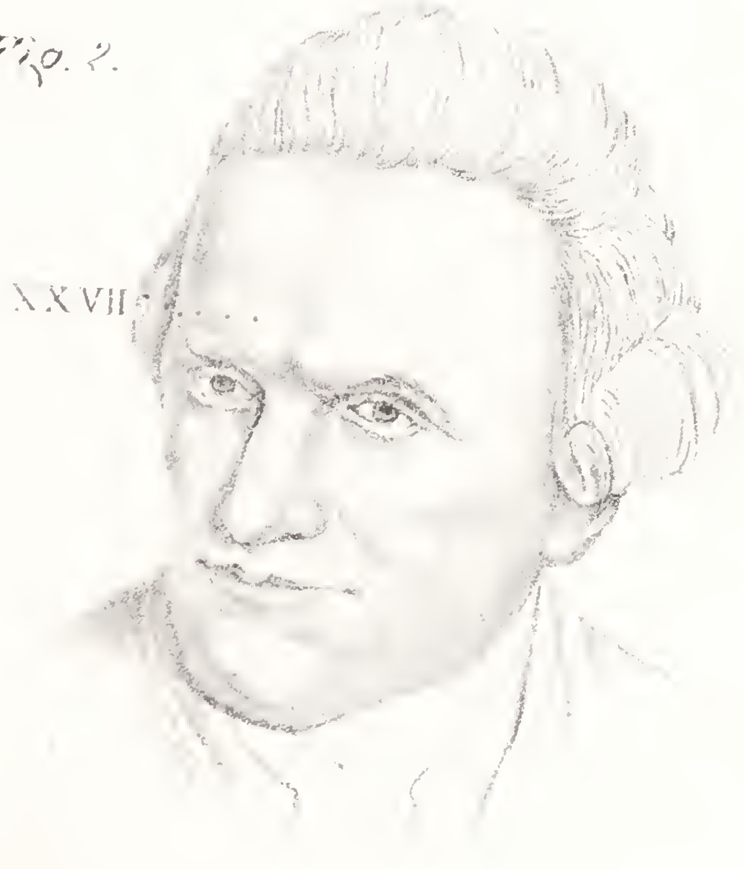


Pl.XII

Fig 1

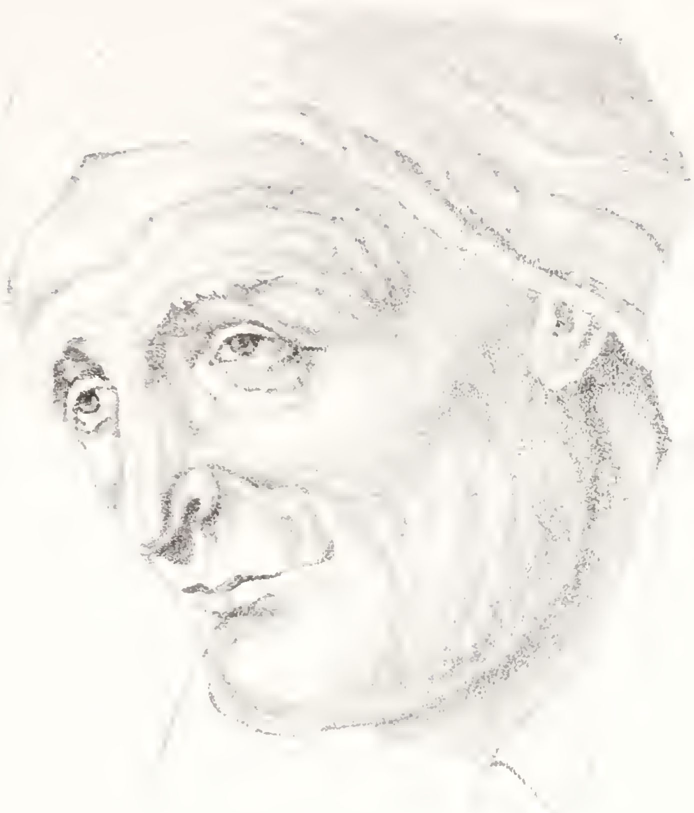


Fig 2

Pl XIII

Fig. 1

XXV

XXXIII

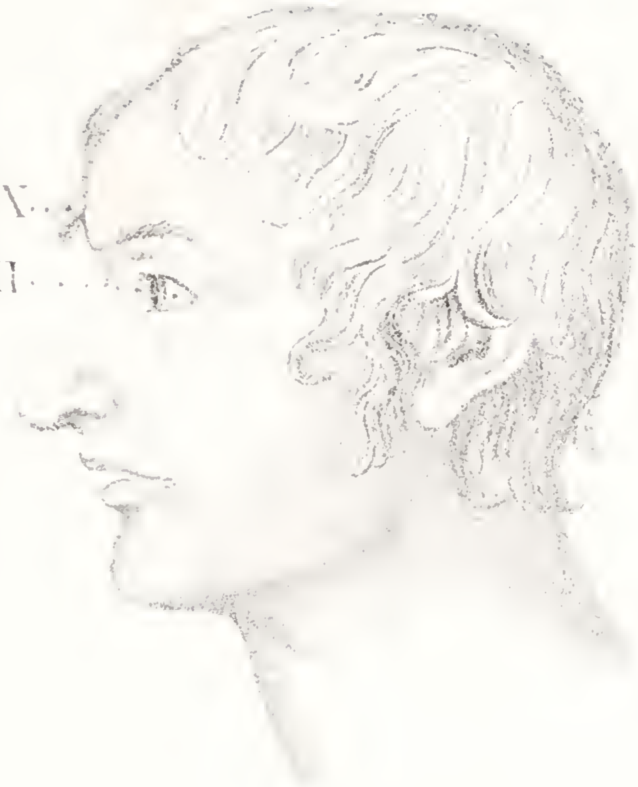
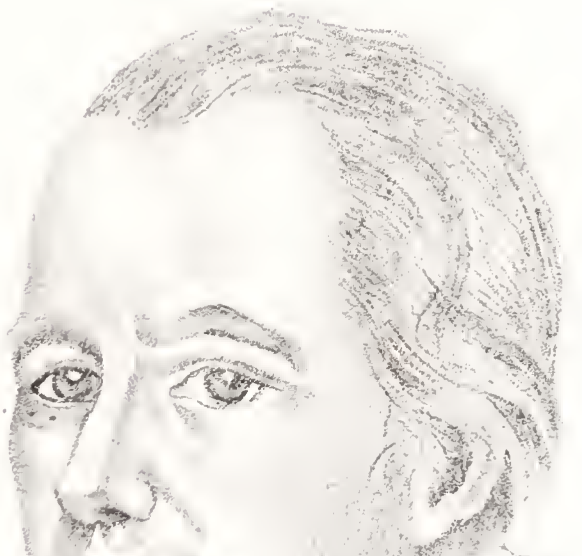


Fig. 2

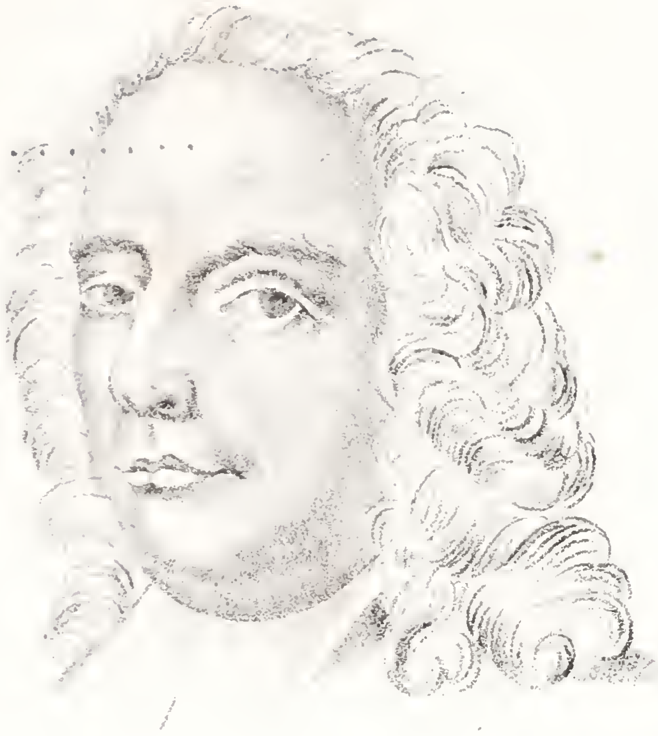
XXXIII



Pl XIV

ig 1

XXXIV



g. 2

XXXV